NATURE MAGAZINE

OVEMBER 1933 35¢ VOL. 22, NO. 5

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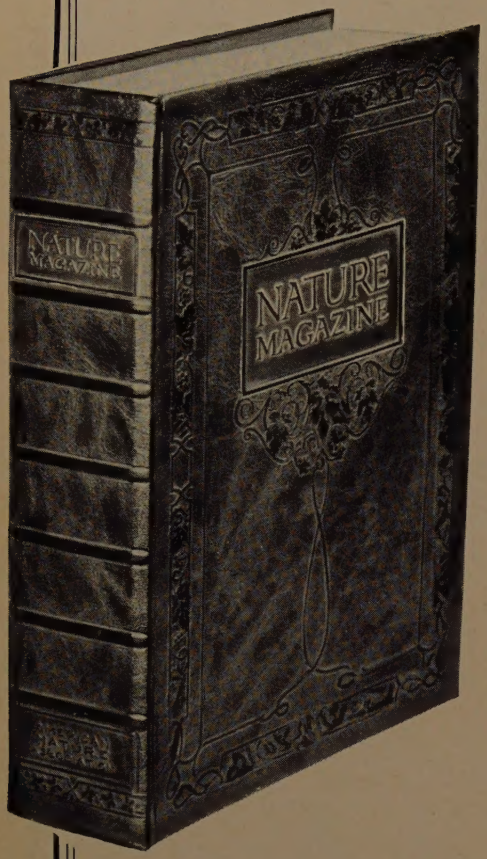

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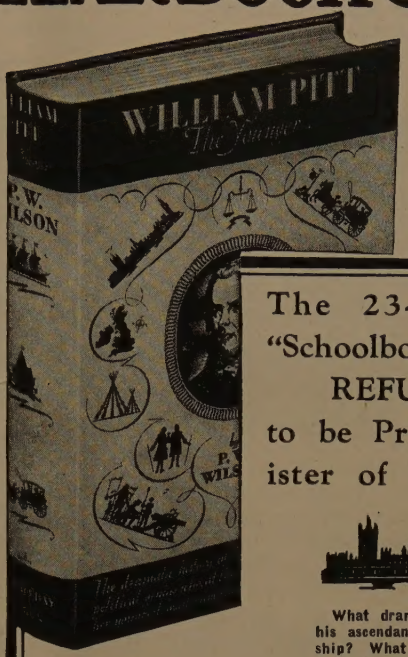

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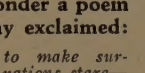

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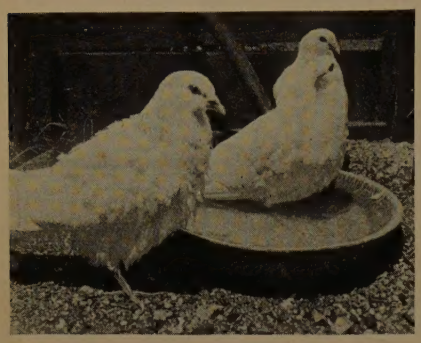
Finding Pictorial Subjects

By Carl Naether

If your hobby, perchance, is photography and if it brings you much real satisfaction and joy, you have, in all probability, wondered often just where you would find a suitable subject for the next picture. To you it may seem that you have exhausted all the beauties and all the oddities, near and far, whose charming color scheme or strange contour you might appropriately transform into interesting and acceptable pictures.

Such, at any rate, was my predicament until I learned to see pictures in the simple and commonplace incidents occurring everywhere round about me. How often, for instance, had I observed my White Kings



enjoying water and sunbath almost simultaneously in their roomy pen without recognizing the opportunity for getting a picture of my pets suggesting that "cleanliness is next to godliness" among lovely white pigeons, too.

Even though as a boy, I entangled many a dainty butterfly within the soft folds of my capacious net, the thought of catching one with my Kodak never occurred to me till a large and very handsome swallowtail alighted again and again on a shrub in the flower garden of the Mission of San Juan Capistrano. Having for some time been successful in his "flighty" and oft-repeated attemps to evade my camera, Mr. Swallowtail finally posed within a few feet from me, affording me barely enough time to snap him.

One Sunday, late in the afternoon, I came across the swan family at the edge of a placid little lake in a public park. "What a picture!" I thought—the downy little fellows sailing serenely between their father and their mother, all apparently in search of their evening meal—the snowy white of the old swans in bright contrast with the deepening black of the lengthening afternoon shadows. It turned out to be a picture neither hard to find nor hard to take.

In an obscure corner of the same lake bloomed white lilies, their broad fleshy leaves responding lazily to the faint ripples of the water. After contemplating the colorful scene for a minute or two, I set my camera for a close-up, lifting the flowering plants out of their obscurity, so to speak.

These few but satisfying experiences with amateur picture taking have taught me that there is beauty almost everywhere we go, if only we open our eyes to see it—and, of course, our cameras to record it.

Plant Close-ups

"Apropos of the query how to take close-ups of plant life," writes Louisa R. Gleason of Ada, Michigan, "may I add to your suggestions that of using as wide open a lens as possible. As a rule, I use the 4.5 F stop, which gives a clear picture of the object and, by diffusing the background, obviates any necessity for an artificial background, which, to my way of thinking, detracts from the interest of the plant picture. Sometimes a flower group will cover too much space to be in focus with the use of the 4.5 F opening, in which case the 8 F opening can be used without seriously altering the amount of diffusion of background. The larger opening permits of a shorter exposure, an important factor, for even on an apparently windless day, there seems to be enough air stirring to cause a blurred image if the exposure is too long."

Better Pictures with Poor Light

For a long time amateur photographers have been handicapped because the newer and faster working films were not available for their rolled film cameras. The large film manufacturers, such as Eastman Kodak and Agfa Ansco, always replied to every inquiry that it would not do to offer better film to amateurs, because they wouldn't know how to use it and the results would be spoiled. Just recently these companies have decided that amateur photographers have a little real intelligence, after all. First they offered the Verichrome and Plenachrome films, which were nearly half again as fast as the old regular rolled films, and amateur photographers learned that the results they achieved were well worth the slight difference in cost. Now supersensitive panchromatic rolled film is available in addition to the Verichrome and Plenachrome. It can be purchased for practically all cameras taking pictures from the Leica and Contax camera sizes up to 3¼ x 5½, or postcard size. Eastman or Agfa supersensitive panchromatic film is fifty per cent faster than Verichrome or Plenachrome in morning and afternoon light, and it is three times as fast as either of these films by artificial light, due to its remarkable sensitivity to red and orange.

The effect of faster film is almost the same as that obtained by getting a new and better lens for your camera. You can take many kinds of pictures that were impossible before. Those early morning and late evening snapshots which used to be so dark and unsatisfactory may now turn out all right. Under conditions which required a "stop" or diaphragm opening of F 11 with the old orthochromatic film, the correct exposure for Verichrome or Plenachrome is halfway between F 11 and F 16; for supersensitive panchromatic it is F 16. All other exposures must be shortened proportionately.

The principal thing to remember in connection with panchromatic film is that it must be handled differently in the dark room. If you do your own developing, you will have to learn to work in almost total darkness. A very faint green light is the only kind of dark room illumination permitted. If you have your films developed by a professional, you must be very sure to tell him what kind of film it is. Otherwise, all the good results will be spoiled. If you have just finished a roll of old style film or Verichrome film and then put in a roll of new supersensitive panchromatic film, don't put the old exposed film into the new empty box without marking clearly on the outside what kind of film it is. Be even more careful, when changing from supersensitive panchromatic film to one of the older types, not to get them mixed up.

The new supersensitive panchromatic films, either Eastman or Agfa, are available from all leading photographic supply houses. It may be that they can not be bought at every corner drug store, and, therefore, when starting on a trip this summer, be sure to stock up with enough film of the right kind in advance.

About Cloud and Sea Pictures

We all admire those lovely pictures wherein the white clouds stand out against the background of the clear sky. They are not difficult to take, but one must use a little extra cap called a filter over the lens. With the old orthochromatic film one must have a yellow filter. Better results will be achieved with Verichrome or Plenachrome film with the same type of yellow filter.

When using new supersensitive panchromatic films, we find that the yellow filter does not accomplish the purpose at all. The filter we need to get lovely cloud effects with panchromatic film is a green filter. No other will do so well. Consult your nearest camera dealer or professional photographer or write to the Photographic Editor as to how to get the right kind of camera filter.

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

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FRONT PAGE STORY

• • •

WHY DOES THE NATURE ITEM HAVE SUCH APPEAL?

• • •

RECENTLY a deer found himself perilously perched on a cliff in Watkins Glen State Park in New York. He had fled there with his doe, who fell to her death on the rocks below. To frighten the deer would have meant for him a similar fate. So for days various means were tried to entice the animal from his ledge. Authorities came and pondered. The news services carried detailed stories every day reporting upon the state of the deer's health and the progress of his rescue. Photographers snapped his pictures from points of vantage. Over a holiday week-end a special police detail was necessary to hold back the thousands who came to see the beleaguered animal. Meanwhile he munched fodder let down to him and waxed fat and healthy. At last he made his own way off his ledge and disappeared into the woods. All over the country people said to one another, "Well, I see the deer got off the cliff. Isn't that fine?"

Not long ago a spider snared a small green snake in its stout web. As the little reptile struggled the busy spider built its silken sheath about the captive. There were moments when it appeared that the victim was about to escape. Then the entanglements were strengthened and the battle of Nature went on. And this time the news services carried the story from the web-side. Pictures appeared in newspapers and rotogravure sections and this struggle of snake and spider became table talk throughout the nation.

When, in the National Zoological Park in Washington, a little gorilla became ill of lung and panted in the throes of pneumonia, a whole city sat figuratively at his bedside. Eminent physicians joined in consultation. An oxygen tent was brought so that the little fellow might lie within it and find more ease for his tortured lungs. The office of the Director of the Zoo was besieged with telephone calls asking as to the health of the patient. The newspapers published bulletins from the attending physicians. Citizens offered delicacies of all sorts, even choice wines. There was real sadness in many homes when the wrinkle-nosed simian youngster gave up his valiant battle.

Frequently there are stories of the freight car pushed to a siding so that the nest of a robin built on a coupling and filled with blue eggs will not be disturbed; or of the mail box in which wrens have nested being posted with a sign "Do not disturb. Use temporary mail box"; or of a steam shovel that stands quietly while a bird raises its family within the scoop. A good Nature story is always good for a box or special head on page one.

Why? What is it that will bring the ire of witnessing citizens down upon the head and person of the man seen beating a horse or the moron mistreating a dog? Why are fire departments so often called out to rescue a trembling kitten from a tree top amid the cheers of the populace?

We have asked ourselves and our friends. The answer is difficult of precise definition. It is one of those intangible and instinctive things that seems to be within most of us. In fact, when it is absent something vital and essential seems to have been left out. Which reminds us of the incident of a man who had been employed for some months in a position of financial trust. He was discovered to have embezzled funds. When the news came to his employer he shook his head sadly, saying, "It's my fault. I should have fired that fellow six months ago. I saw him coming around the court house corner one day. A dog was trotting along bothering nobody. This fellow took a kick at him. Anyone who will do that has something wrong about him, and I should have known enough to get rid of him."

Yes, there seems to be inborn in most people a fundamental interest in dumb creatures—sympathy for them in their plights, affection for them as pets, interest in their activities as a part of the scheme of things. It is not a complicated impulse because it is instinctive and sincere. Often it is buried by the complications of civilized existence and mode of living. But it is there none the less, and it comes out when the opportunity arises.

There is only one thing that bothers us about it and which we have never been able to explain to ourselves. We have never been able to reconcile the fact that many of those who hunt for the sport of it have this interest in wild life just as strong as those who do not hunt, often stronger. We have never been able to understand why a man who would be interested, for example, in seeing the deer safely off the ledge, even to the extent of aiding it in its escape, would go out when the season opened and shoot deer. Perhaps there is an answer, or, perhaps, it is just one of those complicated things about human nature we will never understand.

MUSKY AT HIS HOME
IN THE SWAMP

NATURE MAGAZINE

VOLUME 22 NOVEMBER · 1933 NUMBER 5

MUSKY

THE TRUE STORY OF A FOOLISH AND LOVABLE LITTLE MUSKRAT

BY MARI SANDOZ

ILLUSTRATED BY EDO ANDERSON

WHEN Father drove his buckskin ponies out of the valley and left us alone on his new homestead, twenty-five miles from the rest, I kicked a loose sod as nonchalantly as I could. My brother James spit into the dust. Father was a frontiersman, a locator and trapper. Staying alone in the wilderness of sandhills and rattlesnakes meant nothing to him. But I was only thirteen; James younger. Before Father was out of sight we ran to the shack for the twenty-two rifle and climbed to the top of the south hill to look around.

During the hot days of August we saw scarcely a cowboy. Mostly just meadowlarks, grouse, perhaps a dun coyote against the morning hillside. There were no near neighbors so we spent our time hunting in the hills and the drying swamp of the valley over the hill north, or watering the few scrawny cabbages in the lower corner of the ragged breaking about our shack. Now and then we saw a rattlesnake under a tilted sod, found coiling tracks about our shallow-dug well, or caught the faint smell of dead things that clings to the haunts of the diamond-back. I knew about rattlers. I had been in the hills once before, alone with Father, the time he was struck on the back of the hand by one. He shot the swelling off with his pumpgun and collapsed into the wagon. With the buckskins' unfailing sense of direction I got him to help. But I still dreamed about that day, especially here in the pitch-piny shack with holes for windows and the door; sleeping on the ground, in the center of the breaking.

Here is a story that has that quality known as color. It is the tale of a childhood experience so vivid and so youthfully important that it never dies. We all cherish such memories but few of us possess the ability to recreate them so effectively as has Miss Sandoz.

One night I awoke in a cold sweat, the blood pounding in my ears. Something scaly and cold moved slowly across my neck. I had to let it, and every moment I expected the punctures of fangs from a flat, arrow-shaped head.

I listened. There was not a sound. Even James, rolled in a blanket a few feet away, seemed not to breathe, as though already dead. And somewhere in the dark was the cold body, the poised head. The blackness of the room began to shimmer in fiery spots, pressing down, choking me. At last I had to breathe, and with the sound of a ripsaw through the stillness. There was no movement anywhere. Nothing except the faint smell of dead things.

Two feet away was the lantern, and matches, and along my arm lay the warm barrel of the rifle. But these things were as nothing—for somewhere, near my face, near my eyes, perhaps, was the cold, scaly body of a snake. A move and there would be a whirr, a strike. Suddenly the darkness went spotty again. I was already bitten. My arm was numb, cold. It was spreading.

Then something cold touched my cheek, not piercingly, as with poisoned needles, but daintily, as the lick of a black tongue.

From there on I don't remember much, except that I lay tense and unmoving for as long as it took to build up all the layers of the earth under me. Gradually I became conscious of someone whispering.

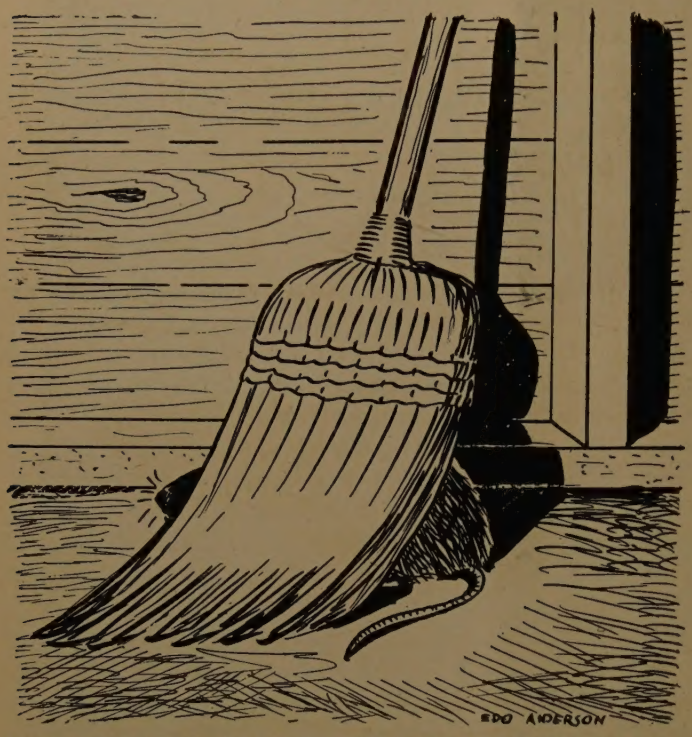
"Mari, Mari,"—very softly.

It was James, but I dared not answer. For the thing that had touched me had not moved away. When my brother's whispers veered from fright to horror, I answered, out of the far corner of my mouth. So we lay, listening, our ear drums almost splitting. But there was

nothing to hear except the faint sound of quarreling water birds in the swamp, the occasional deep call of the thunder-pumper, the sudden sharp howl of a coyote on a knoll. At that there was a soft, swishing sound at my ear and then nothing more.

Daylight came and at last the familiar things took form—the stove, the home-made table, the bench, finally the ridges in the dirt floor and James' drawn, frightened face. Cautiously I lifted my blanket. Nothing. But there, between us, were many tracks as of a finger drawn back and forth in graceful curves on the rough ground.

We slipped into our shoes and before dressing looked about the shack, even upsetting the cowchips from the fuel box. At last we settled down to breakfast.



"A BLACK, FLATTISH TAIL AND A BROWN, FURRY BUNCH SHOWED ON ONE SIDE, ON THE OTHER A BIT OF DARK NOSE AND WHISKERS"

Suddenly James made the queerest noise, dropped his fork, and ran to the corner where our old broom stood. A black, flattish tail and a brown, furry bunch showed on one side of it and on the other side a bit of dark nose and whiskers. James jerked the broom away. Cowering in the corner was a muskrat, two-thirds grown, pulled together into a shaking lump of frightened brown fur. So that was the cold tail that trailed over my neck; his whiskers, not a snake's tongue, had touched my cheek. We leaned against each other in foolish relief and laughed until the little fellow scurried away under the wall, where he had probably been all the time we were looking for him. But he soon was back behind the broom.

By dinner time we had Musky, as we called him, eating before us, nibbling with his bright yellow teeth at the thick roots we dug for him in the swamp. When we spoke to him he stood up tall and sniffed but returned to his food.

By evening we had put up a sod pen about three feet high, with the top link of our stove-pipe, which kept blowing off anyway, buried in the ground for a burrow and a nest from a rat house in the swamp in the far end. We built a little pond lined with alkali mud and fringed it with rushes, cat-tails, and arrow-heads. But Musky ran back and forth, trying to get out.

"Let's let him go," I suggested, half-heartedly, because our backs ached and our hands were blistered.

About dark he let James push him into the stove-pipe with the spade handle, but only a little way. After all, we couldn't tamp him into his hole as you would soil about a post.

Before we rolled up in our blankets we took the lantern out but couldn't find Musky. The next morning he was gone; nothing left of him but a hole between the sods. We were suddenly very lonely and a little angry too at his lack of appreciation. James walked through the browning marsh grass to our dried out water-hole, calling "Musky, Musky." I fried pancakes.

And then while we ate he came out from behind the broom. Our enthusiastic reception frightened him into a lope through the doorway but we headed him and drove him back into the house. Once more he settled behind the broom, his bright eyes watching. After an hour or two of apparent neglect he sallied forth to smell at the bit of pancake we dropped for him.

Musky was curious and liked to explore the legs of the table, the stove, the chip-box, standing up and reaching as high as he could with his queer hand-like forefeet. Once he stuck his nose against the hot ash-pan I lifted from the stove. He gave a sharp little squeak and loped away to his broom, wriggling his nose. There he rubbed it with his paw and looked at me from hurt eyes. The next morning he was gone.

"You went and let him burn himself!" James complained.

"Aw—can't he learn to keep out of the way?" I demanded in sisterly resentment. But I spent several hours searching for tracks like the insertion on my Sunday petticoat, a strip of graceful curving like ribbon in the center. That was his tail. The regular, dainty little spots on each side were the tracks of his feet. But the wind had rippled the surface of the sandpass leading to the swamp. I gave it up and went home to put the shack in order. We were expecting Father. James took the twenty-two and went out alone, pretending to look for game.

And then all at once Musky was in the doorway, wrinkling his nose in the air. Satisfied that he was welcome he slid in and plodded to his corner. He was round as a ball, his sides sticking out like a bloated cow's. For the first time he let me pick him up. He even snuggled down in my arms and went to sleep. There was a scabby place on his shoulder, with a little dried pus, probably an old battle wound. From this came that dead smell I caught the night he trailed his tail over my neck and pushed his whiskers gently against my face. I sopped the

scab with a solution of carbolic acid and let him sleep curled up in the corner.

That evening Father came, with Jule, our eldest brother. We tried to coax Musky out to nibble crumbs but he was shy and aloof. Probably not hungry. Anyway he took one look at the newcomers and scurried to the door.

"Head him off!" Father ordered, but Musky slipped between my awkward feet.

"Oh, now you let him get away. His hide is green yet but he'd bring fifteen-twenty cents."

James and I looked at each other. Of course our trapper father would look at it like that. Jule took the lantern out but came back alone.

"We'll set a trap for him. He may come back," Father said over his pipe.

There wasn't much we could do. Remonstrances were out of order in our family, but a little subterfuge was not. When the rest were in bed I slipped out and listened. It was September, chilly, and the rattlesnakes holed up for the night. So I slipped through the breaking. Down at the lower edge of the garden plot I heard a soft gnawing that stopped every time I moved. Probably Musky in the cabbages. I sat down and called softly. The noise stopped completely and after a long time I felt something like fluff along my stocking and a cold nose against my hand. He let me carry him to the house and put him into an empty nail keg. There he was, a round, brown ball, when I crossed the frosty yard the first thing the next morning.

By the next evening we got permission to snap the number one steel trap set along the door. Father decided he might as well wait until the fur was prime.

That day he tacked in the windows and hung the door. Jule tried to make friends with Musky but the little chap's affections couldn't be forced. When our impatient brother tried to make him nibble at a root as he did for us, Musky bared his yellow teeth and snapped them on Jule's finger. He almost died for his daring. James rescued him and ran away, the frightened little head buried under his arm. When we were alone again he learned to trust us almost as before. He still slept behind the broom and foraged about the room at night, his long digger nails making a loud noise on our new floor. On cold nights he snuggled in at James' feet. Sometimes he tried trailing along when we went hunting but he couldn't understand this climbing the towering sandhills and after the first pitch he usually gave up and plodded back to the cabbages and the sod corn or waited outside the door until we came to open it.

Musky made few noises with his mouth. Once or twice when I stepped too close to him he gave the funny cry of the day he sniffed the hot ash-pan. And once when a coyote howled daringly close to the house he cried like that outside the door and scratched frantically until we let him in to be safe in our companionship.

He was less and less interested in the roots we brought from the swamp, preferring to chew on the loose nubbins from our corn fodder or on a bit of cabbage. Snow fell. Musky's fur got thick and close and grayer, but still a little shaggy, not glossy as that of his kind in the cold swamp. He got fatter and softer too, and when Mother came down with the household goods and the babies she found him in the cowchip box behind the stove.

"Out you go!" she commanded. "No, I won't have animals like that in my house. Couldn't you catch a badger or maybe a skunk or two?" She chased Musky out into the dark with the old broom that had sheltered him so often. It was sad.

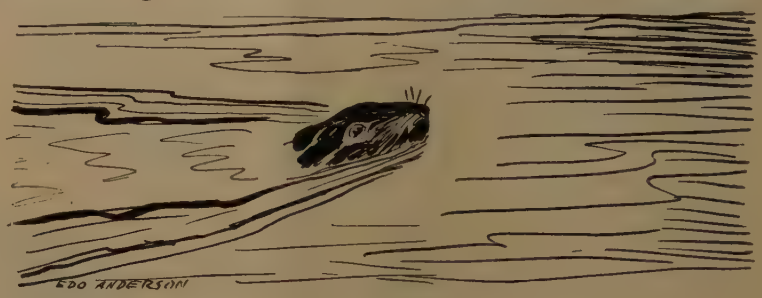
"PREFERRING TO CHEW ON THE LOOSE NUBBINS OF OUR CORN FODDER OR ON A BIT OF CABBAGE"

But the next day we found that he had made a nest behind an anchor post of the windmill set up on the new well that took the place of the old spade-dug hole, now covered with a few boards and hay so the children wouldn't fall into it. Musky seldom came to the house after that but he got his cabbage hearts and his corn, and he drank at the chicken trough. And often I was scolded for spending my time scratching his jolly soft sides and pulling his fat cheeks when I should have been minding babies. Sadly I gave up my free ways of the last few months. My *Wanderjahr* was over.

But James was loyal and even Jule fed Musky now and then. Father scratched his beard and laughed as he told us, prophetically, how much he would get for the hide.

When winter was upon us we carried home sacks of hay and, with manure over it to generate heat, made a house for Musky. He trotted out to the chicken coop to eat and drink and, while the rooster was suspicious, the hens ignored him. But somehow he seemed a little neglected and sad now. I hoped he would make the break and run away, not to the north swamp, however, for Father was chopping into the freezing rat houses and setting traps.

Then one day as I poured steaming water into the frozen chicken trough, Musky didn't come. I hadn't noticed him for several days. Neither had the boys.



"Now you let him get away," Father said, but even he didn't seem to be so very sorry.

The winter was cold but short and February brought a fine thaw with snow-water running. It washed away the hay from the old well and Mother decided it must be filled. Something floated about on the surface. We dipped a bucket under it. Musky. The call to water had become too strong for him.

His hair was slipping and so we buried him in the dead cabbage patch. James almost cried for this foolish little Musky who deserted his fine swamp and his gay fellows for a corner behind an old broom, some cabbage hearts, and two stupid children. And I didn't share James's boyish fear of shedding honest tears.

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BLOODROOT IN THE GARDEN

BY BESSIE L. PUTNAM

SOME of the wildings readily adapt themselves to almost any growing conditions. Others are delicate. Unless we are willing to study their individual needs, it is almost a crime to force such plants into our garden plan. In fact, unless we are equipped to give them of both our knowledge and our careful study, we should never attempt this sort of gardening. The more sturdy and plentiful kinds should first be sought by the beginner. Then, as skill and knowledge and a better equipped ground come with experience, we may gradually increase the number of our wards with some assurance of success.

Even if we have only a corner in a sunny garden, we may still grow wild flowers if we choose them with care. The only stand of bloodroot—a strictly woods plant—with which the writer is familiar grows in the corner of an abandoned garden the planter of which died many years ago: There, among the weeds, it blossoms every spring, a joy to local botanists and flower lovers, though all of its woodland sisters, once common in the vicinity, have been destroyed for miles around by the root diggers of the drug trade.

PHOTOGRAPH BY E. M. KITTREDGE

BLOODROOT IS BECOMING RARE

Ruthlessly gathered and pillaged, successful growth in the garden may preserve it.

Bloodroot takes kindly to cultivation, blooming earlier and having larger flowers because of the more fertile garden soil. With ordinary care and conditions, we believe that transferring it to the garden is one of the surest ways of perpetuating this plant. A striking feature is that when the fleshy rootstock is broken a red juice, like blood, exudes. This juice, browner in color than that of the root, extends to every part of the plant except the petals, and we can only marvel at the strange alchemy that preserves their purity in the midst of a dyeing process which reaches every other part of the plant.

The red juice from the root was used by the Indians for decorating their tomahawks and faces, though the skin of the paleface is sometimes as sensitive to it as to poison ivy. The Indians also used it as a dye for coloring their blankets. Druggists still claim for the rootstock some of the medicinal virtues that attracted the early housewives.

THE HEN WATCHED ME, NO MORE THAN MY HEIGHT AWAY

She is more modestly garbed than her mate, gray and buff dominating her plumage with scattered spots of white. Her tail is buffy

THE DARK GROUSE OF THE NORTH

BY BEN EAST

PHOTOGRAPHS BY THE AUTHOR

IF YOU travel far in the pine forests and deep spruce swamps of the North—those swamps where a thick carpet of sphagnum muffles your footfalls, where moss-grown logs lie in a tangle of dampness and decay, where ancient fire-charred stubs lift their bleaching spars above the saw-toothed tops of fir and spruce and larch—you may meet, some day, a small dark grouse that is not afraid of you.

He will have dark gray plumage, a black chin and tail, a necklace of white spots across his breast and a patch of jewelled scarlet above each eye, and he will not act like the other members of that wary, man-shy clan. He will walk unhurriedly away beneath the trees at your approach, or fly up among the low branches of a convenient spruce or tamarack and perch there without alarm while you walk past within arm's reach of him.

This unwary dweller of the deep timberlands is the spruce or Canada grouse, perhaps better known as the spruce hen and often dubbed the fool hen because he shows so little fear. Without question he is the handsomest member of the grouse family, at least of those members found in the eastern half of North America. The ruffed grouse of the richly barred buff-and-brown plumage and the black epaulets is a creature of striking beauty, whether on his spring drumming log or among the gold and scarlet leaves of the autumn hardwoods. The ptarmigan in his white cloak of winter is not unpleasing to the eye, and there is a modest beauty about the prairie chicken and the sharp-tail. But the lot of them must yield place to the spruce cock, gallant of the deep-shadowed swamp thickets. The dark grays, the clean blacks and whites of his plumage, the splashes of scarlet above his eyes and his proud bearing are without peer among the grouse. Call him fool hen if you will, because he has never learned the lesson of fear, but no more charming bird dwells in the brooding dark wilderness of the North.

You may have to go far north to find him, because his ranks have thinned as the pine and spruce forests have been cut away and settlers invaded his range. In the forested lands I know best, along the south shore of Lake Superior, only a remnant of the original spruce grouse population remains. I am told the same is true in New England and northern New York. Fortunately the very lack of wariness that contributes so heavily to the bird's disappearance also makes him of little interest to sportsmen, among whom most members of the grouse clan are held in high repute. Too, in Michigan at least, he is given the full protection of the law. On these facts there is reason to base hope that his dwindling tribe may at least grow no less, and may even regain a share of its former abundance in those few remaining tracts of spruce and fir that are to its liking.

I had spent many a day on the North Country trails, I had camped in lonely cabins miles from the nearest road,

I had followed the beaten runways of moose and deer, I had met the gray jay, the log cock, the loon, the fish hawk and most of the birds of the northern wilderness before I saw my first spruce grouse.

It was on a warm morning in late May, in a dense swamp of spruce and fir and stray jack pines on the shore of a little beaver-flooded lake in the Two-Heart country. Wet spots, carpeted deep with soft sphagnum moss and densely grown with tangles of Labrador tea and leatherleaf alternated through the swamp with fairly dry, open areas where the arbutus grew as I had never seen it before, spilling its matchless fragrance in a largesse that filled all the swamp like a rare, sun-distilled incense.

We were on our way to a small stream that led, between beaver dams, from the little swampy lake to the clear waters of Lake Superior a mile or two away. From a patch of Labrador tea we flushed a grouse of some sort. The bird rocketed up among the spruce trunks with little thunder of wings and bored away into the swamp before we had more than the briefest glimpse of a hurtling bundle of feathers. It was not until we had given over our futile search for the nest we thought might be hidden in the Labrador tea, and followed on through the spruces in the direction the grouse had taken, that our high hopes were confirmed. We had flushed a spruce hen. She was perched on a low branch of a fir tree, with a tracery of dead twigs and needle tufts falling about her, like the lines of a Japanese tapestry.

The hen spruce grouse is more modestly garbed than her mate. Tones of gray and buff dominate her plumage, with scattered spots of white. Her tail is buffy where the tail of the cock is black and she lacks the scarlet eye patches that are the crowning glory of the male bird of this species.

So perfectly did the somber coloring of the spruce hen blend with the colors of twigs and lichen-flecked bark there in the fir tree that had she crouched in a hiding place close against the trunk or in an angle of a larger branch—had she hidden herself away as craftily as the ruffed grouse hides among the tans and grays on the hardwood forest floor—I am sure we should never have seen her.

THE STRUTTING SPRUCE COCK

They call him fool hen because he has never learned the lesson of fear, this dark grouse of the swamps

It is the way of the spruce grouse to perch quietly while you walk beneath the branch on which it stands, perhaps less than the reach of your arm above your head. Often it can be—and has been—brought down with a club. But for some reason this hen showed signs of mild nervousness. Perhaps there was a nest, not far from the Labrador tea thicket, that we were too dull of eye and scent to ferret out. At any rate she craned her neck and moved along the branch, and twice appeared on the verge of flight while I was still beyond good camera range.

I moved slowly, making no hurried movements, circling the fir tree in the hope she would believe I had not seen her, but steadily drawing nearer, taking care never to look directly toward her. Often a wild bird will withstand a long and stealthy approach as long as you look away. Look them once full in the eyes so they know themselves discovered, and their courage breaks.

I came near enough at last and leveled my camera. At the clatter of the shutter she jerked her head around and then settled down on the branch as if finally deciding that this slow-moving intruder meant no harm.

I circled farther around the fir tree to get the sun upon her at another angle and while I drew closer she sat there watching me, quiet and unafraid, until I stood almost beneath her, and she peered down at me no more than my own height away.

Then Brunson, who sat motionless on a low hummock a dozen yards away, spoke softly: "To your right—on the ground."

A bird was coming there, advancing underneath the tangles of leatherleaf and Labrador tea in a series of short quick steps and brief halts. A dark bird that came quietly but not warily, through swamp thickets so dense that I could not get a fair sight of him.

Suddenly he stepped out into a little sun-flecked opening, a male spruce grouse, the mate of the quiet lady in the fir tree, resplendent in his spring plumage, a proud and gallant forest nobleman in robes of dark blue-gray, sable-and-ermine-decked, with a jewelled crescent of carmine over his eyes.

Fool hen? Dub him that if you like, but certainly there

SHE WAS PERCHED ON A LOW BRANCH OF A FIR TREE
Twice she seemed to be on the verge of flight from her perch

was nothing of the dolt in his bearing as he advanced out of the leatherleaf thicket straight toward me, or nothing of the coward, either. Rather he seemed to resent with proud dignity my intrusion of his domain. Is one to be called a fool because he has never learned the lesson of fear, because there is no room in his heart for the antics of the craven? Then only does the spruce grouse deserve the name of fool hen!

As the bird came on he spread his tail fanwise like a strutting tom turkey. The feathers of his neck and breast were lifted until they formed a black ruff across which the necklace of white feathers made a broad ermine bar. His wings drooped until the tips almost scraped the ground. Two white-tipped feathers stood up like short round ears just ahead of his tail, and behind that full spread fan the lower tail coverts stood out in a stiff circle like the war bonnet of a Sioux warrior.

Instinctively I jerked open and leveled my camera but the cover on the floor of the swamp was too dense, the patches of deep shadow and bright sunlight too sharply contrasted to hope for a picture even if the bird came within range.

Still with spread tail, erect ruff and drooping wings the grouse came on, with short mincing steps now, stopping every few feet to peck sharply at the empty air or halting at the base of a spruce tree to knock away a few scraps of bark, as if in proof of his unfaltering courage.

Then he reached the end of a fallen log no more than thirty feet away, circled around it, turned back, hopped up on the mossy trunk—and the eternal hope of the wild life photographer swelled within me. That log led toward me, its nearer end less than a yard from where I stood. The smooth trunk afforded a natural pathway for the strutting grouse and midway of its length it was for the space of a yard clear of leatherleaf and Labrador tea. And on that short open span the sun fell bright and unflecked.

If only the grouse would strut the length of the log, if only he would come as far as that open, sunlighted space. Twice he took a step or two in my direction, and twice he halted and looked aside as if minded to take a less exposed route. Then he came on once more, boldly this time, still with short mincing steps like a cadet on parade. On the ground glass of the camera I followed him along the log. Until he stepped out into the full sunlight, I do not think I breathed.

HE HOPPED UP AMONG THE LOW BRANCHES OF A JACK PINE
Even there he could not seem to forget his pride and springtime vanity

He did not even flinch at the clatter of the shutter and when he halted he stood at the end of the log within reach of my hand, facing me quietly and unafraid. The shadows were heavy there but I swung the camera slowly until it covered him. It was useless. He was so close that he more than filled the ground glass and I could not bring him into focus! I moved the camera aside and for a full minute he and I studied each other. If I am any judge of the emotions of birds he felt only curiosity about me by that time. He looked his fill, returning my gaze steadily and unwinking. Then he hopped down from the log and circled away, still strutting.

I followed him slowly, hoping for another chance with the lens. He led me off some fifty feet before he hopped up among the low branches of a jack pine.

Even there he could not seem to quite forget his pride and the springtime vanity that surged through him, and when I photographed him, framed by the pine branches, it was with ruff half lifted.

After a few seconds he flew down and walked slowly off through the swamp once more. We made a discovery then. We learned that as long as we followed him he would lead us off, by devious routes, deeper and deeper into the swamp, alternately walking and flying up into the low trees, farther and farther from the fir tree where his mate still sat so quietly. Once we turned back in her direction, however, the male grouse came toward us again with spread tail and drooping wings, circling ahead of us as if to draw our attention to himself.

FRAMED BY THE PINE BRANCHES WITH RUFF HALF LIFTED

After a few seconds he flew down and walked slowly off through the swamp

Was his proud strutting only a gallant ruse to lure us away from the hen bird, much as a mother ruffed grouse feigns a broken wing to draw intruders away from the vicinity of her brood? Was the entire show staged as much in resentment at our presence and in hope of driving or coaxing us away as to impress the gray and buff lady who looked on from her refuge among the fir branches?

I do not know, but I suspect it may have been a little of both. The spring strutting of the spruce grouse is well known to men wise in the ways of birds, and they speak of it always as an antic of courtship. Yet I am not so sure but there was something of the warrior as well as of the suitor in the bearing of the dark gray gentleman that morning, not sure but his thought was as much to defend his lady as to woo her—a gallant, this fool hen.

One thing he did not show us that I would have given much to have seen and heard. That was his drumming. For this grouse of the spruce swamps drums, beating out his thunderous, tumultuous song of courtship with his wings, much after the manner of his ruffed kinsman of the hardwoods. It is a muffled, rolling madrigal, this wing song, weird and resonant, and doubtless sweeter to the shy hen grouse than are the silver notes of the hermit thrush singing for his mate at dawn.

I have my best description of the drumming of the spruce grouse from John Linklater, who grew up in the lodges of the Chippewas north of Lake Superior and knows the North Country as well as any man may know it.

The bird's favorite drumming place is on a log, deep in the swamps, Linklater says. He poses at one end, lifts himself vertically into the air and drums as he rises to a perch six or eight feet above the log. A moment's pause and he slants downward toward the opposite end of the log, rolling forth his thunderous wing music as he goes.

From his new station he again rises vertically to a convenient perch, then tilts obliquely back to the end of the log from which he first started, still drumming on the wing. The same performance is repeated over and over, Linklater says, the vertical rise, the slant down from perch to log, and all the while the bird beats out his strange song of pride and ardor!

Some day, in a deep swamp in the North, you may chance to meet this grouse of the dark gray plumage and the ruby eye crescents. Spend an hour or two with him, in the brooding silence of his wilderness haunts. He will meet you unafraid and unwary, as will few of the wild folk today. He will walk ahead of you on the mossy floor of the swamp without quickening his stride because you follow. He will feed on the buds of spruce and fir while you look on. He has never learned the lesson of fear, this dark grouse of the swamps—but once you know him you will not call him fool hen.

And let the citizens of each state that still has in possession a few pairs of this superb species stay their hands when the opportunity to see one is granted them. Let each one so privileged strive to tell his fellows of the priceless charm that lies in even a fleeting view of so rare a treasure. A rumpled carcass or even a preserved specimen is small reward beside the consciousness that there still lives in its chosen haunts a pair of these birds.

SIDE VIEW OF A FLYING FISH ZOOMING OVER A WAVE

Their fins vibrate rapidly like wings and they often soar for a flight of half a minute and for distances estimated to be about three hundred yards, although usually shorter

FLYING FISH

BY HUGH STERLING DAVIS

Hugh Davis is the youthful assistant director of the Tulsa, Oklahoma, Zoological Park. He went with the Martin Johnsons to Africa, and sent back this story of the flying fish encountered en route from New York to Capetown. Below is seen a view of tropic seas from his stateroom porthole. In these seas the winged fish joyously disport themselves.

FLYING fish! Those bits of aero-aquatic life that make a sea voyage into tropical waters so interesting, especially for the Nature-interested folks. Basking in the warm tropical sun at the bow of a ship, lying flat on one's stomach, lazily letting one's eyes drift over the blue waters below. Ah, what a life!

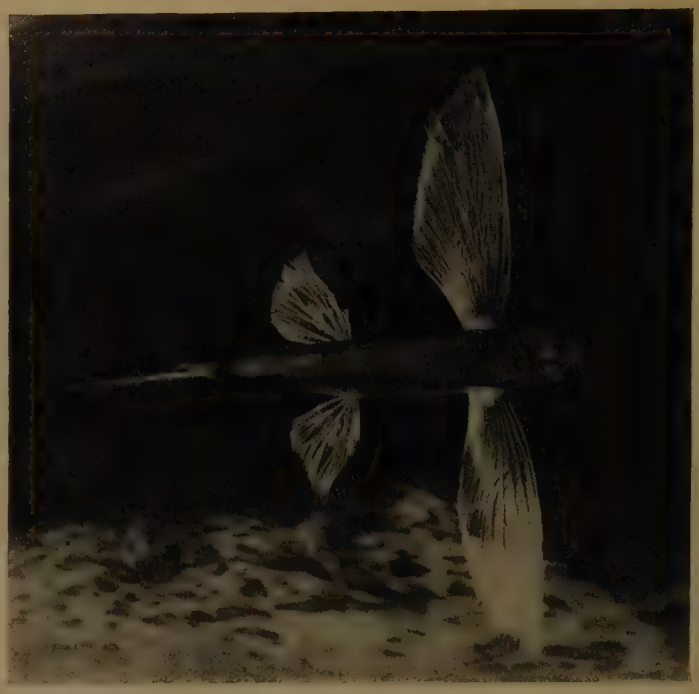
Then, out of the shifting banks of waves, streams a silver blue object. Rapidly it flutters its wing-like fins and glides over the rolling swells into the distance, where it drops back into the water. A flying fish. Yet did it fly, glide or just jump from the water with enough force to carry it several hundred yards through the air? There are various opinions about the way a flying fish navigates the air. So, as we made our way toward Capetown, South Africa, I spent many hours watching those graceful fish that fly the air channels above tropical waters. Three days out in the warm waters of the Gulf Stream I saw the first few flying fish. They looked to be about one foot in length with a wing spread equally that long. However, the greater numbers were to be seen in tropical waters later on.

Nine days out from New York the ship was rolling heavily and the white-capped waves lapped up to within ten feet of the stateroom portholes. It was night and the glow from the portholes must have shone like a beacon light to any creature in the surrounding waters. During one of the ship's dips to

the starboard side a flying fish shot through a fourteen-inch open porthole and crashed headlong into the opposite wall, crushing its bullet-like head and killing it instantly.

That particular fish, attracted by the light, had plunged through the air, rising at least ten feet to hit the shining circle. It was an amazing direct shot, or an accidental bull's-eye. Undoubtedly many flying fish are killed by missing their aim and plunging into the side of a ship. They are often found on deck in the morning and are eagerly eaten by the sailors. They have a palatable flesh when cooked.

With a specimen now at hand it was possible to get the size and shape by measurement, and also to photograph it. Stream-lined throughout, each curve is an asset for this fish's speed and flight. Ten and one-half inches long by eleven and one-half in extent it was, with large wing-like fan-shaped fins five inches long by three wide. On the tail assembly of this aqua-aero glider are two more wing-like fins, two inches long by one wide. A shark-like tail acts as a rudder while the fish is in flight as well as in the water. The body is square with rounded corners tapering toward the tail. Its head and nose is bluntly rounded and its eyes are large, a good one-half inch in diameter. This particular specimen was grayish-blue in color, its close fitting scales having an iridescent hue of grays and blue-blacks. Others I have noticed over the side of the bow are brown, while yet others are a bright blue. In the mouth of my "porthole" fish I found a small water bug or larva an inch long, which it had just scooped up for lunch before taking its death dive.



A VIEW OF THE FISH FROM ABOVE

Here the proportion of wing-span to length of body is vividly shown, indicating their bird-like character

Timing the duration of flight on fifty individual flying fish I found the longest flight lasted for one-half minute, the fish covering approximately three hundred yards as near as distance can be judged on the open water. On an average they stayed in the air for fourteen seconds, but the greatest number of flights were only a series of short jumps or flutters through the air.

In calm water the flights were longer than those in rough, choppy water, where the air currents were so uncertain that the fish would be dumped into the water or hit a wave head-on. The duration of flight, whether into the wind, across it or down wind, does not make much difference. However, most of the longer flights are taken against the wind.

When a flying fish emerges from the water, its wing-like fins vibrate rapidly and the tail fin kicks the water for the take-off. This is for only a fraction of a moment and is nearly invisible to the naked eye. Once in the air the fish glides over the water, about three to five feet from the surface, rising and falling with the contour of the water below. Occasionally they touch the peak of a swell with their tail, at which time the tail is vibrated rapidly, propelling them forward a bit faster. The "wings" are also vibrated from time to time. Thus the fish actually does fly.

Schools of fifty or seventy-five sometimes rush from the water at once, scattering over the water like a flushed covey of quail. Evidently the greatest reason for the flying fish's flight is to escape from some larger preying

JUST OFF THE PROW OF THE SHIP

Sometimes the fish appear to be frightened by the bulk of the ship and take to the air close to its side

fish. The bulk of the on-rushing ship frightens many of them and they sail near the bow of the ship often rising quite high from the water, possibly because of prevailing air currents. It may be that much of their flying is done in play, because they often seem to scamper over the surface, lightly tripping here and there.

To watch those interesting bits of activity hundreds of miles from land will make one drift into another world—a world of carefree happiness. Your gaze rides over the waters like a flying fish, soars through the air currents like a bird, then plunges into the wetness of the blue ocean, as though to be gobbled up by some denizen of the deep. And you are left wondering at the mysteries of what lies beneath the surface of the sea.

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THE EDIBLE PASSION FRUIT

BY STEPHEN HAWEIS

ONE of the things which the average man is unable to comprehend is why it is impossible to obtain the good things of the earth which are easy to grow and transport. It is an odd fact that the very finest fruits in certain classes are practically unknown outside their place of origin, while others of the same family are quite well known. Fruit products of far off countries have sometimes been developed into huge industries and others are left as though they were of no importance at all. Great changes have been made in some fruits by means of study and cultivation, but there is still a great deal to be done by individuals with vision and capital. There are new worlds to conquer.

The purple passion fruit, or granadilla, is one of these. It is known to many only as a garden plant. It is often confused with one or another of its cousins, none of which equal it in flavor, appearance or packing qualities. Its Latin name, *Passiflora edulis,* should give one a hint that it is the edible kind—and the eatable kind—because, although several of the others can be eaten they cannot be eaten with much enthusiasm. Their best friends admit that. The purple passion fruit is a native of Brazil, but its commercial cultivation is associated in our minds with Australia, where it was introduced in 1892. For twenty years or so the vine was not cultivated to any great extent outside a radius of a hundred miles from Sydney, but it is now widely distributed all around the coast, and at the present time nearly three million pounds of the fruit are produced annually without exceeding the local demand. There have been one or two attempts to grow it in California, but they have failed to be properly advertised.

People do not know how to eat the aromatic yellow pulp which is full of black seeds. The fruit is about the size of a large egg and the simplest method of attack is to decapitate one end and treat it like a boiled egg, but with a little sugar stirred in instead of salt. It is surprising the number of them a good Australian can get away with in this simple manner. Its further use is for flavoring ice-cream, jellies and especially fruit salads, to which it gives its peculiar cachet, even in very small quantities, so that no fruit salad is complete without it, as no curry is complete without grated cocoanut, when once you have learned its value.

A vine in full bearing, at three years old, should have a bushel of fruits per annum—or four hundred and thirty fruits.

The plant deserves attention for its beauty as much as its fruit. Its large, deep-lobed leaves are wonderful for pergolas and screens and the poet can take delight in its exquisite purple and white flowers, which take their name from the Passion of Our Lord. The corolla represents the crown of thorns and the lacy white fringe may be likened to a nimbus, or halo. The pistils represent the three nails, the stamens the hammers, and the five petals and five sepals represent the ten faithful apostles. But Christians and pagans alike are agreed upon one thing, it is a vine which produces good fruit—good commercial fruit with vast possibilities for the United States. The fruit has already established itself in the English markets and is a regular article of fare upon the menus of popular restaurants, but it must not be confused with similar yellow fruits like the *pomme de liane,* or water-lemon, which is a somewhat sad experience for a gourmet. The giant granadilla, or barbadine, is not much better—it should compete in flavor with the watermelons. It objects to travelling considerable distances also.

BEAVER—MAKER OF HISTORY

BY BEULAH ROLLINS

ILLUSTRATIONS BY JEX

AMERICA'S FIRST AGRONOMIST FOR WHOM
OOOH AH
IN 1609 CHAMPLAIN VIA QUEBEC AND
HUDSON VIA "HIS" RIVER SET OFF A LONG TRAIN OF HISTORIC EVENTS
FOR HIS PRECIOUS PELT THE CHINA TRADE DEVELOPED AFTER 1790.
CAPTAIN GRAY DISCOVERED THE COLUMBIA RIVER IN 1798.
LEWIS AND CLARK TRAVERSED THEIR OVERLAND ROUTE
AND JOHN JACOB ASTOR

We North Americans of today are wont to smile indulgently when reminded of the beaver and to regard him only as an amusing chance acquaintance, forgetting that he has played a noteworthy part in the development of our continent and that we owe much to this industrious little animal. His one-time importance is enshrined in the heroic traditions of the Hudson's Bay Company and of the North West Company of Canada and in the accounts of Alexander Mackenzie's epic journeys to the Arctic and the Pacific. All these British undertakings had the beaver for their foundation.

But the United States can boast an equal indebtedness to this little rodent. During millenniums prior to our forefathers' landing on these shores the beaver had been damming the streams and so retaining in the impounded waters the silt and humus which would otherwise have been carried to the sea. The fertility of most of our valleys, our farms and even our flower gardens was initiated by the teeth of a small, furry and tireless gnawer who made arable the valleys which the ice age had created, thereby becoming our pioneer agronomist. His successful efforts at soil reclamation antedated the earliest experiments of the Department of Agriculture and the Garden Club of America by probably at least a million years.

This was the condition when, in 1609, Samuel de Champlain entered the northern part of present New York State and Henry Hudson sailed his Half Moon into New York Bay, ascended the river that now bears his name, and, on reaching where today is the city of Albany, ascertained that he had missed the way to China. These two men's arrivals had much to do with furs. Champlain was confessedly seeking to enlarge the area of the peltry business of New France—an attempt he promptly thwarted by a few ill-advised shots which, aimed at Iroquois Indians, transmuted the Algonquian confederacy into an active military alliance with the British and so changed the course of civilization in eastern North America. Henry Hudson, though primarily in quest of a route to China, made his employer in Holland a report which, dealing with the commercial possibilities of New Amsterdam's furs, was so enthusiastically phrased that for the next seventeen years peltries formed practically the sole enterprise of the Dutch colonists who settled in our country. The nucleus of all this peltry trade was the beaver.

In this connection it is pleasant to recall that New York State's shield accords a prominent place to the little animal which rendered such valuable services during colonial days.

As the white settlers increased, the beaver and the Indians tended to disappear from the eastern United States, but the beaver's fur maintained its important place in the commerce of the world. Soon after the Revolutionary War, when, about 1790, the China trade commenced to develop, this animal became again nationally prominent. Our ancestors desired tea and other luxuries procurable in the Orient but had little to offer in exchange, so their ships were sent on triangular voyages. Laden with small wares and gewgaws to tempt the Indians of the Pacific Coast, vessels from Atlantic ports sailed around Cape Horn and exchanged their goods of little value for skins of the far West, which were in turn eagerly purchased by the fur-loving Chinese. Thus did the little beaver, slightly aided by the sea otter, provide not only tea, spices, nankeen and crêpes, but also the oriental porcelains, amber, bits of carved ivory and jade, lacquers and whatever else which are now our cherished heirlooms. Our greatgrandmothers danced in silks indirectly sent to them by the faithful little rodent.

One of these seekers for furs along the Pacific's shores was Captain Robert Gray who, in 1798, discovered a mighty river, entered it in quest of pelts and gave it his ship's name, Columbia.

The American fur trade had already become an important industry when, at the very beginning of the nineteenth century, the Louisiana Purchase was made and President Jefferson commissioned Meriwether Lewis and William Clark to find an overland route across our recently acquired lands to the shores of the Pacific Ocean. These explorers opened a new empire to the American nation, though they failed to chance upon a path which might become commercially practic-

able across the Rocky Mountains, and so, in 1810, John Jacob Astor of New York, with President Jefferson's approval, sent west another overland party and also freighted the good ship *Tonquin* with "gentlemen partners," Canadian-French trappers and *voyageurs*, arms, supplies, and articles for barter and despatched it forthwith to trade for furs on the western shores. The *Tonquin's* voyage around Cape Horn, the perilous adventures of both its company and the overland group, and also the founding of a fortified settlement at the mouth of the Columbia River in the present state of Oregon have become a part of our cherished literary lore through Washington Irving's precious book entitled *Astoria.*

Because of Captain Gray's discovery and Mr. Astor's settlement the so-called Oregon Country was successfully claimed by our government in the boundary controversy with Great Britain, a controversy which remained a threatening cloud on the political horizon until an agreement was finally achieved in 1846.

Incidentally, Astor's overland searchers for beaver discovered and were the first white men to traverse a route which was later known as the Oregon Trail and along which most of the Argonauts of '49 made their toilsome journey to California.

During the heyday of the fur trade beaver skins passed as money, they having an established rating across the continent and as far east as the Atlantic Coast of approximately four dollars for an average raw skin. Following the transfer from hand to hand of the skins themselves other currency such as small stones or bits of metal, each bearing a crude drawing of a beaver and the initials or mark of a well-known trader and representing an actual skin lying in some storehouse, passed freely among traders and Indians.

Gradually the value of the beaver pelts waned until they became merely one of the least modish of furs. Tradition states that they lost their commercial worth when the hatters of Belgium discovered that top hats could be made from the fur of the Belgian hare, but modern historians have denied the truth of this tradition.

The use of beavers' fur in the making of hats during several hundred years is attested by numerous authors. Chaucer describes one of his characters as dressed "in a mantle and a beaver hat"; and Addison says, "You see a smart rhetorician turning his hat; a deaf man would think he was cheapening a beaver, when he is talking of the fate of a nation."

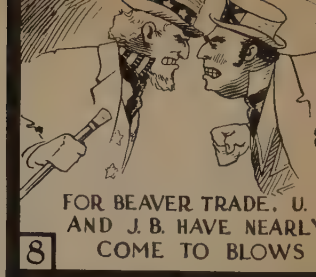
Whatever its present status, this unassuming little animal may accurately claim that he gave to our forebears luxuries and wealth and that his western cousins gave Oregon, Washington, Idaho and part of Montana to the United States.

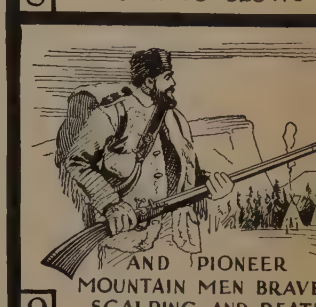
Coyotes and beavers have continued to lead their lives and attend to their own affairs less affected by the ways of men than have any others of our wild animals. Indeed, beavers have been wont to attend to their own affairs so enthusiastically that the lives of men have been occasionally somewhat inconveniently affected by the ways of beavers.

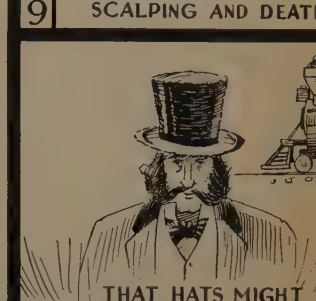
We learn from the journals of Lewis and Clark that on August 4th, 1805, Lewis, when leading the foremost group of the explorers, was forced to change his course and to follow another branch of the Missouri River's headwaters. Writing directions for those who were to follow, he left the paper "on a pole at the forks of the river" and pushed forward. His journal entry of two days later records this simple statement: "at 4 P. M. they arrived at the confluence of the two rivers where I had left the note. This note had unfortunately been placed on a green pole which the beaver had cut and carried off together with the note." And so a little animal quietly attending to his private business forced Captain Clark and footsore and weary men of a great exploring expedition to make a long detour.

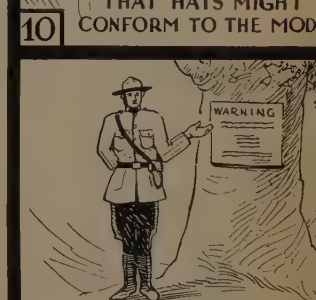
In the early days of steamboat navigation on the Missouri River, long before the era of western railroads, a much heralded steamboat reached the head of navigation just as the waters of the river had commenced their autumnal lessening. The boat had been widely advertised as about to make prompt return downstream to St. Louis but it spent the winter in Montana because, during the scanty crew's shore-leave of thirty-six hours, beaver swung a dam behind the vessel, intricately interlaced the dam into the paddle wheel and so effectively dry-docked the whole affair that clearance could not be accomplished before the river's rapidly receding waters had lost their floatage.

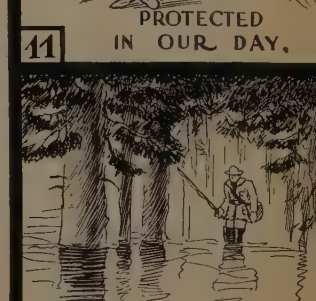
Among more recent achievements beaver have materially increased the cost of fly fishing in certain areas. The Province of Quebec, which formerly allowed the trapping of its beaver during a short annual season, announced some time since that for a long term of years no beaver should be killed or snared. Thirty-six months after this announcement beaver became so multiplied that in my husband's fishing club, for instance,

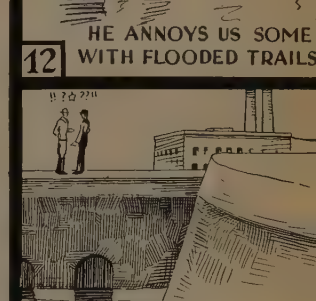


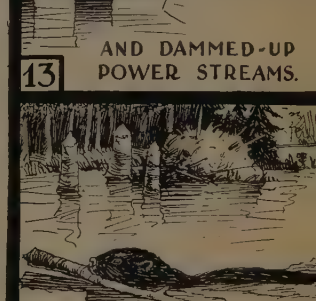












each member has ever since been necessarily assessed each year fifty dollars to repair inundated trails. On our last visit to this club, when approaching one afternoon our favorite camping spot, we found the local trail knee-deep in water. Four guides and my husband spent hours in destroying a wide section of a beaver dam, and, weary and humid, we made camp after dark. When our breakfast was served rather later than usual on the following morning, our guide remarked with a quizzical smile: *"S'il vous plaît, Madame, les castors l'ont tout refait."* Inspection disclosed that not only had the dam been repaired perfectly but also a pile of sticks was in readiness at each of its ends, should we do further damage.

Nevertheless the beaver has elsewhere been the fisherman's ally. In the region of the Catskill Mountains, when enticed by sticks and logs which men had purposely placed at salient points on the banks of trout streams, the dentiferous mechanic has created ponds beloved by local anglers.

At a strategic point on a Canadian river human engineers built a cement barrier containing an opening through which the waters poured into turbine engines, generating power for mills and the electric station that were situated some distance downstream. Immediately after the formal ceremonies of opening, the plant refused to work one night. Telephone inquiries of the watchman at the intake on the barrier disclosed that it was not he who had shut off the water. Search revealed that since the beginning of twilight the beaver had dammed the intake for the turbines, their inherited instinct being to prevent the loss of water. Ejected from this advantageous site, they retreated up the river, shut off the entire stream and left the cement barrier high and dry more than once.

A few years ago and not far from New York City, a pair of beavers discovered in a lake on the noted country estate of—let us call him Mr. Noname—were warmly welcomed. The animals' appearance was a nine days' wonder, but other than their tracks traced to the neighboring automobile highway, no inkling as to their origin could be deciphered. Upon the shores of the lake was a sizeable and cherished grove of birch trees which had been artistically planted through the combined efforts of Mrs. Noname and a landscape architect. Annually the beaver family increased toward its present numerousness and the trees decreased toward their present nearness to zero.

Because castors are by law wards of the state, Mr. Noname applied to the state's game commission for removal of his insatiable guests. The answer was in effect: "One thousand dollars fine and one year in jail, should you disturb one of our pets." The beavers and the Noname family still use the same post office address.

To a creator of American soil, an early American engineer and economist, a patriot in our dispute with Great Britain, and an endearing nuisance, we owe our gratitude.

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HIS NIBS THE EMU

AUSTRALIA HAS HONORED HIM

BY KILROY HARRIS

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IN THE old Colonial days, immense flocks of emus, the national bird of Australia, roamed over the inland plains. Although still to be found in large numbers in some districts, recently they have become rare in places where formerly they abounded. The emu is one of the most interesting inhabitants of Wilson's Promontory National Park, in the State of Victoria. Here they are "tame wild birds". The emu figures in the Australian national coat of arms, and is to be found on all present-day Australian stamps, supporting King George's head at one side of the stamp, while the national animal, the kangaroo, decorates the opposite corner of the postage.

ACROBATIC MR. ELEODES BEETLE STANDING ON HIS HEAD

This is the curious posture of this insect when disturbed, and he will often hold the pose for several minutes, until he feels that the danger has passed

BEETLES THAT STAND ON THEIR HEADS

LIGHT ON SOME DESTRUCTIVE INSECTS WITH CURIOUS HABITS

BY J. S. WADE

U. S. BUREAU OF ENTOMOLOGY

SUN beat down and the vagrant wind tossed dust about as I trudged a sandy mid-West road hunting beetles. Over my shoulder I carried a borrowed pitchfork and my pockets bulged with little boxes destined to hold my prey. Shortly I came to a cultivated field edged with an accumulation of dead Russian thistle plants. The pitchfork went into action, turning over the clumps of dried weeds. On the ground there was a great scurrying of crickets, ground-beetles and other insects. But among them were some awkward-looking, slow-moving black beetles. And what were they doing? They were one by one standing on their heads.

However, I was prepared for this acrobatic reception, having studied such literature as was available on these fellows. Many times before I had seen them do their stunts. As the day wore on I turned over many another pile of debris and searched them out here and there. They all put on their ridiculous performance, and when I turned back toward town the boxes in my pockets held many beetles being taken back for further acquaintance.

The object of my trip to this region and of my countryside wanderings was to find out all I could about these beetles. It was no idle curiosity, either, because these insects, in their various forms, are serious pests, causing great economic loss to the farmers of the Middle West and some parts of the Pacific Northwest. There was quite a bit to be learned about them.

TYPICAL ADULT ELEODES

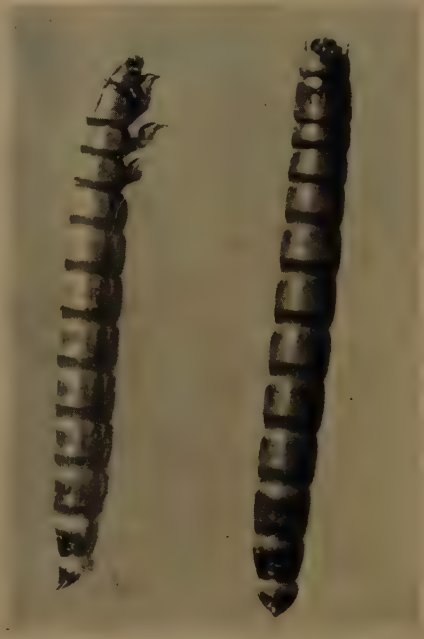
How this pest that causes so much trouble in the wheat fields should look when you meet him

To go back a bit. When the Long expedition was sent out by John C. Calhoun, then Secretary of War, to explore the Rocky Mountains, there was a member of the party named Thomas Say. He was a learned and versatile naturalist whose sole concern was what crawled, ran, jumped, hopped and otherwise moved about in this region. Among the specimens Say brought back were some of these beetles, which he studied and described, naming them *Blaps suturalis*. Later they were renamed *Eleodes suturalis,* and several relatives have been described and classified. *Suturalis,* however, remains the most destructive of the lot. Not that the farmer calls him by any Latin name. On the contrary, "stink bug" is the title. The worms, or larvae, are commonly known as wireworms, sometimes being called "false wireworms" to distinguish them from members of a related family of somewhat similar appearance.

To return to our history: the development of great farm areas in the West brought about a gradual decrease in the native grasses and other food plants on which this insect fed. It had to change its tastes and change them it did, developing a liking almost approaching a mania for

wheat and other small grain crops. Farmers would sow their wheat in the autumn and whole rows and sections of the field either would produce nothing or merely a sickly growth. It was because the worm or larval stage of the "stink bug" was getting its nourishment. Similar activity might be going on where seeds of oats, corn, millet, kafir and other farm products had been planted, but the wheat field was the most popular eating place.

This is what goes on. When the fall-sown grains begin to soften in the ground and prepare to send forth sprouts, the larvae get busy. Sometimes two or more eat the contents of a grain and leave the husk. Even when the wheat is shocked and stacked before threshing the larvae nibble the ends of the grains. And when the farmer faces a problem of scarce rainfall the beetles add to the difficulty by being particularly abundant, doing tremendous damage to the slowly-germinating grains. And all this goes on underground, insect racketeering of the worst order.



THE LARVAL OR WIREWORM STAGE

It is in this stage that most of the damage is done to the germinating wheat seed in the ground. Below, another typical beetle of the genus Eleodes, author of much damage

The beetles spend the winter snugly beneath piles of rubbish, grass, weeds and refuse, or buried in soft sandy soil or in the burrows of prairie dogs, ground squirrels and other small mammals. In some instances the insect goes through the winter in the larval stage, buried deeply in the soil. In a latitude such as southern Kansas, they emerge early in the spring and are around until late November. Some of the beetles have been known to live two or three years.

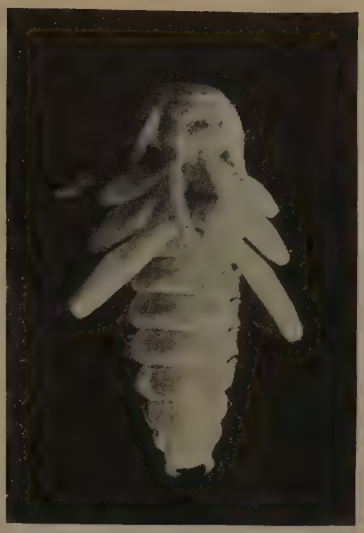
The eggs of the beetles are ivory-white, elliptic-cylindrical in form. They are slightly larger than an ordinary pinhead. They are deposited in the soft loose soil not more than an inch deep, from ten to sixty eggs in a single cluster. It takes from eight to ten days for the eggs to hatch and the young larvae start right away to feed on vegetable tissue and root fibres in the soil. Immediately after hatching they are a creamy-white gradually becoming brownish-yellow. In from 110 to 130 days they form a tiny earthen cell and go into the resting or pupal stage. The pupae are oblong, pinkish-white objects with head and appendages only partly formed. They remain in this stage from ten to twenty-two days before the transformation into the adult beetles. Then the beetle may turn around and produce another generation of larvae in late summer, these usually wintering in the ground and ruining the wheat crop. Since there is considerable overlapping of generations one finds larvae of varying sizes in the same small area of a field.

The worst infestation is usually found close to wherever there may be piles of discarded weeds or other accumulations, although the hungry worms spread over the entire field. When they get too crowded they turn cannibal and feed on each other. While they seem to prefer a slightly moist soil, once they have grown a bit they seem to manage much too well in hard soil. The larvae seem sensitive to any kind of disturbance and will, when touched, become motionless and play dead. Pick one up and the pressure of the fingers sufficient to hold it will set it wriggling to escape and meanwhile it ejects a colorless and offensive liquid. This last is apparently defensive against birds and other enemies.

It is the beetle, however, that boasts the most curious habit of all. Disturb one and down goes its head on the ground and up into the air goes the rear portion of the beetle. In this acrobatic pose it may remain, motionless, for several minutes. If sufficiently annoyed while in this posture, the beetle will eject quite forcibly from its glands a quantity of reddish-brown fluid. This has a highly offensive odor and we do not have to go further to discover the reason for the common name of "stink bug." The beetles are most active during the cooler portions of the day, taking siestas in their favorite shelters during the warm bright hours. In cold weather they hibernate under their sheltering pile of rubbish, often digging into the ground.

But I did not go out to study *Eleodes suturalis* for my own amusement or to find out what it looked like. My aim was to discover some way of reducing its depredations. There had been experiments in the direction of treating the seed with chemicals or disinfecting the ground. Most of this had not only not killed the larvae but had retarded or entirely prevented the sprouting of the seed. Insecticides in any reasonable amount did not

prove effective and were too expensive. Trapping the larvae with poisoned vegetables worked in small plantings but was hardly practicable on large areas. Thus far it seems that the best control lies in the rotation of crops, planting the wheat field to some crop that can be frequently and regularly cultivated. At the same time all accumulation of dead grass, matted weeds, old straw stacks, old bundles of mixed weeds and grass and other rubbish should be burned so that they will not harbor beetles beneath them. Piles of dried Russian thistle, favorite of the beetles, particularly should be destroyed. Some fertilizers also might have a slight value as insecticides, but their principal value seemed to be in the stimulation of plant growth and possibly in aiding soil drainage.



THE PUPA OF THE INSECT

For all his bad habits I enjoyed meeting *Eleodes suturalis*, not so much on his account but because he takes me back in memory to days under the great open sky with the feel of the wind upon my cheeks, the sight of the endless stretches of waving grain, or the dried thistles rolling along in the stiff breeze. And I can see again, with unfailing interest, the awkward black beetles lumbering by me in review, each one pausing to salute me by surprisingly standing on his head.

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GONIOPS

BY H. H. SCHWARDT

INSECTS as a class give little attention to the protection of their eggs. It is true that many species place them in carefully prepared holes, or cover them with a protective secretion, or in other ways try to insure their survival, but to sit on the eggs after the fashion of an old hen is positively unusual among insects.

Such however are the unique habits of a certain rare horse fly, which, for want of a common name, must be called *Goniops chrysocoma. Goniops* deposits her long white eggs in a neat mass on the under side of a leaf, usually of the maple. The mass may contain as many as three hundred eggs, the entire lot being about the size of a grain of corn. Immediately after depositing the last egg the fly takes a standing position over the mass, digs her claws entirely through the leaf to insure a firm hold, and presses her abdomen against the upper surface of the eggs so that it forms a complete roof over them. Here she remains until she dies or is removed by actual force. The twig with leaf, fly and eggs attached can be removed, taken to the laboratory, photographed and subjected to other unnatural treatment without causing the fly to desert her eggs. Usually she dies and drops from the leaf soon after the eggs hatch.

If this fly's devotion to her eggs has a purpose it is not to incubate the eggs. They hatch just as readily if she is removed from them. The presence of the female *Goniops* probably does exert a considerable protective influence over the eggs. When the nest leaf is disturbed as by another insect walking over it the fly vibrates her wings in a manner which produces a buzz of surprisingly ominous tone. This warning note probably serves to intimidate many insect enemies and some of the smaller birds. It apparently is of little value against the minute wasp-like parasites which deposit their eggs within those of the horse fly. These little wasps walk about over the egg mass unmindful of the fly's intermittent warning, and stab the surface eggs with their needle-like egg laying organs. Sometimes the parasites arrive soon after the fly begins her egg mass and thus are able to place their eggs in nearly every egg of the fly. Thus it frequently happens that an egg mass produces over two hundred parasites and only a dozen horse fly larvae.

The eggs which hatch produce yellowish-gray bottle-shaped larvae which drop to the ground to live for a year or more under leaves, stones, or logs. In northwest Arkansas the larvae pupate and the adult flies emerge between May and July. The adult fly is slightly larger than a honey bee and covered with beautiful golden yellow hair.

"THE COVE" A STUDY IN LINE AND MOVEMENT

Paper-pulp, sand, cement, a bit of moss and a twig have been fashioned into an attractive and interesting scene drawing charm from its very simplicity

MY AMERICAN TRAY LANDSCAPE

BY PATTEN BEARD

AUTHOR OF "ADVENTURES IN DISH GARDENING" AND "MY AMERICAN DISH GARDEN"

THE EXQUISITE art of the Japanese tray landscapes has for many years fascinated me. It is an art akin to poetry, and in Japan it ranks with painting, music and drama. It has its schools and followers. It has its public exhibitions. It is highly developed, governed by conventions of form, materials and the tools of its craft. No mere Occidental may hope to achieve more than a suggestive use of its ideas. He has neither the time, the patience, the skill, the materials, or the tools that the Japanese employ. Yet, in spite of this, I have formulated a simple craft of tray landscapes that anyone may follow and enjoy in shut-in months of fall and winter.

You may copy the spirit of the tray landscape if you have an understanding of Nature's forms. It will train the eye to closer observation. Skill will come as you progress. You may create something for end-table, desk, or stand ornament on which the eyes rest and find outlook, poetry, or suggestion of outdoors!

The tray landscape, in Japanese called *Bon-kei,* is a representation of realistic landscapes upon trays or shallow containers. Its origin is in the remote past when the Japanese reverenced the lines, beauties and supernatural virtues of stones which they used in gardens or brought into their homes. These stones often suggested to the imagination mountains, mountain ranges, cliffs or shores. So the Japanese artist made upon trays exquisite and perfect representations of Nature in varied forms and called them *Bon-seki.* Perhaps they may show a distant shore with white breakers, or a waterfall between rocks. The rushing water or the swirl of breakers on the shore near cliffs is made real with colored sands.

We are more or less familiar with photographic reproductions of these but the actual instances of the practiced art are only to be found in the museums in this country. The art, if practiced here, is practiced privately in Japanese homes. The art is national and is never commercialized.

We must in no way confuse this art with the perpetrations of florists who call certain plant-arrangements "Japanese Miniature Gardens." These have no Japanese background. They are merely a clever appeal to buyers of hardy plants.

The real Japanese miniature landscape is always realistic. It is perfect in its illusions of perspective. It is balanced. It may or may not contain growing things. It may or may not be made up so that it is permanent. But if it contains such elements as moss or twigs, these are easily renewable. The *Bon-seki* is permanent. It contains no living thing. It is made up of stone and sands or gravels. *Bon-kei* may contain moss, twigs, or other vegetation.

It is an interesting subject to investigate—this art of the Japanese. And I have developed an adaptation of it in its tray landscape form. It is something you may like to

"THE GLEN IN WINTER" IS AN EFFECTIVE CREATION
Here the paper-pulp is fashioned into a hilly scene, the little twigs made into trees and table salt used to cover the little glen in with the softness of snow

practice and enjoy as a new Nature hobby. You will find it an absorbing pastime. And you will be able to give your leisure to creating charming little Nature lyrics that you will love so much that you will not want to part from them. But they make original gifts, eagerly welcomed. You will probably keep one or two where you can enjoy them all winter.

Here is what you need: old newspapers, a bit of Portland cement, some sands—white, brown, red, or blue. You can do with fine white sand if nothing better offers. You will need a paint-box, either oil, tempera, or water-colors, and brushes, small and large. You will also need some soft finishing brushes in varied sizes down to quite small, these to be used in brushing the dry sand into formations.

Most important, as a beginning, is the tray you must have to work upon. If you can find an Oriental shop, try first to buy the type of porcelain or glazed pottery or garden tray. These come at various prices and are either oval or oblong. They are usually white, but if you can obtain a black one it will be better. I should begin with a small tray of maybe eight or ten inches. When you acquire skill you may go on to larger trays.

Where no pottery tray is available, you may buy a papier-mâché tray of small dimensions, or use a small-sized service tray not more than ten or twelve inches long and oval or oblong. It must have a vertical rim. This tray should act as the frame of your Nature picture. Therefore it must be absolutely plain in line and without decoration. If decorated trays are the only ones available give them a coat of good black lacquer.

I cannot guide you in your choice of subject. That must be individual. I can only tell you how to proceed to make these tray landscapes. They are not made with stones. They are made by modeling paper-pulp into formations of shore or mountain, cliff or island.

It is quite possible that the method one individual may elect to use will differ from another's. Since no two reproduce the same scene quite in the same way, the craft of the tray garden offers unlimited scope for self-expression. The Japanese themselves make use of this papier-mâché method, but, since we are not following them as artists, but as craftsmen, it does not seem essential that we follow the minute conventions of the art.

There are many methods of making papier-mâché. One very quick and effective way is to make it with newspapers thoroughly wet and squeezed into a pulp. In this way, I made "Cliffs by the Sea." This is not *Bon-seki.* But it reproduces the suggestion and lyric quality of *Bon-seki.* There is no stone and it took less than an hour to make this little tray landscape.

I took half a sheet of old newspaper, softened it thoroughly in water. Then I dipped the wad of paper pulp into a basin in which I had made a rather stiff mixture

"CLIFFS BY THE SEA"
A tray landscape that is notably effective because of its utter simplicity of design

of Portland cement, squeezed this dry and modeled. On my work table before me was a thick dry newspaper over an old board. I modeled my cliff with spatula and with my fingers, and when I had secured the desired lines and shaping, I sprinkled over the whole a sifting of fine beach sand.

The object modeled should be thoroughly dried out before it is painted. Water-color, oils or tempera may be used. But in giving color, remember that all color sinks in. You may need to touch up later on, so do not be afraid to use vivid coloring. It will tone down mellowly to soft harmonies.

When my cliff was quite dry, I placed it on the small black tray I designed to use for my tray landscape, cementing it to the tray. Then I modeled the foreground of island and placed this to fit into a scheme of pleasing line. Fine beach sand was then sifted here and there on the surface of the tray. With a soft camel's-hair brush, I brushed up varied shapes of water forms.

How many times have you watched the surge of the waves, unseeingly? You will know more about them when you attempt to reproduce the movement with fine white sand brushed upon your tray's surface. Summer snapshots, pictures of seascapes and river, or a brook's rushing waters will give you help in reproducing the general forms suggestively. You will marvel that sand, on the surface of a tray, may actually suggest the surge of waves.

In modeling mountains or chains of mountains as backgrounds, first visualize the general plan. Then build up with the paper-pulp dipped in cement, shaped and modeled bit by bit.

In some instances it is better to cut a base of cardboard on which to make your arrangements. This should fit exactly into the tray. Work on it, later transferring your work from it. Some oil the tray before transferring. Thus cement works loose easier and you can use the tray again.

In modeling large forms begin with the high background, adding to this and shaping bit by bit. I found it a help, once in a while, to coat my work with a brushing of thick Portland cement thereby filling any cracks and smoothing surfaces to better line.

Each section, modeled individually, is set up on the cardboard and permitted to dry, after final sanding. When dry the whole will lift off the cardboard into the tray and you can go over anything you wish after you have cemented the arrangement on the tray. Keep the tray's surface free from grit by wiping with a soft brush, oiled a little.

When this type of arrangement is placed on the tray, the river may be created, after the mountains are painted. The river may be depicted by using blue sand with white sand for waves and

MOUNTAIN AND RIVERS
A landscape that depends on the fashioning of the paper-pulp and the use of brushes

water forms. Cement may be run over the river surface and slightly brushed into water formations. After the cement is dry, it may be painted and tipped here and there with white to suggest the rush of currents.

Where you wish to suggest distance, purple or blue paint may be used. Make the foregrounds darker. Tip high mountains with snowcaps. Experience will be your teacher. The fun of "creating" cannot be taught. If you wish its thrills, experiment. And if you do not want to use expensive trays at start, the chain stores sell little black service trays eight or ten inches in size. From these you may launch into real Japanese trays, or make your own trays from wood with clay rims. These you may lacquer later to achieve the effect of any Japanese shape you may desire.

COURTESY OF "ASIA MAGAZINE"

A TRAY LANDSCAPE CALLED "ROCKY SHORE"

A round pottery bowl used effectively to recreate a fragment of a windswept and craggy shoreline

There is no need for us to follow elaborate Japanese formulas in these tray landscapes. There is for us quite as much interest in the craft as craft alone. As all craft closely approaches an art when skillfully handled, we may yet evolve our own national uses and forms, just as the Japanese have done.

Any seasonal interpretation of Nature is possible. You may create the illusion of spring, summer, autumn, or winter. But in so doing, be guarded in the uses of artificial materials. In "The Glen in Winter" the background, rolling ground of the glen, and its hillocks, were modeled with the paper-pulp. Bit by bit I built up the landscape upon the working surface of a cardboard ground. This I painted to show a winter stream. The ice was made with a brushing of warmed paraffin. Then the trees were set, and, softly and carefully, everyday tablesalt made a light "snow" over the purple shadows I had painted on the paper-pulp rocks.

You may use bits of wild cedar clipped into shape to make trees. Or you may buy trees at your Japanese dealer. I prefer twigs. They may be renewed as those in Japanese tray gardens are renewed after they dry.

It often happened, formerly, that the Japanese reproduced real scenes in their tray landscapes. While one may suggest this, one need not be too literal. Nowadays even Japanese have departed from this literal transcription of actual scenes in these tray landscapes.

Since it is often difficult to secure proper trays, one may adapt a shallow pottery tray for tray landscaping. A simple adaptation of the idea is made in "Rocky Shore." Cedar twigs, clipped, make the wind-blown trees.

"The Cove" is made up in a Japanese tray. Its distant rocks are modeled of paper-pulp dipped in cement, sanded and painted. Its water is cement, brushed while yet soft, and painted. Moss is introduced, with sand at the side where cedar twigs make a clump of trees. Moss and twigs are renewable. They may be sprayed to keep fresh.

It is for you to create your own tray landscapes representing Nature as you see Nature. Observe simplicity as a keynote. Observe line and color. Use as little ornament as possible. The Japanese may introduce temple, pagoda, bridge, or figure into his tray-picture, but if one has not the skill it is wiser not to attempt intricate landscapes that bring in buildings.

Beside this, my adaptation of the art to a craft has distinct educational uses as well as decorative ones. The tray landscapes make excellent school project material for Nature-study classes, for work in physical geography, as well as to teach modeling and craft with skilled finger work and creative motive. For this educational application, buy eight-inch Safety-Ware trays, black, vertical narrow rims at ten cents each. Give the pupils latitude to create their own forms of a given subject that is simple and interesting. Let them apply their knowledge in a creative way to this. If carefully executed each pupil will have made a tray landscape that will be a pleasure to keep permanently.

You who love the outdoors will find in this new craft a delightful Nature hobby! From it you will learn new beauties of Nature because you cannot do it unless there is in your heart the real love of Nature, and unless you have the seeing eyes that can observe and the skillful hands and responsive mind that can reproduce this eternal joy.

THE MIRACLE BACILLUS

BY ELLIOTT R. WEYER

From time to time a morbid historian emerges from some moldy crypt to bring us gruesome statistics relating to the sundry plagues that have in times past thrown a chill over a portion of the human race. As civilizations have had their rise and fall, so also have deadly kingdoms of microscopic life had their day, have flourished unseen and then departed, leaving the survivors with memories of suffering and death.

We are now somewhat more enlightened and know pretty well just what germ caused each of the epidemic scourges, but it was not always thus. Before the microscope carried us into an unseen world pestilence was caused by "miasms" (noxious exhalations), by "evil spirits", or, even, merely by night air! Man's vision, in the broader sense, has indeed increased with inventions which have extended his ocular vision. No more striking proof of this could be found than in the amazing facts concerning visitations in various localities of the "Miracle Bacillus", nor is there any better example of timidity and fear brought about solely by superstition and ignorance. Indeed, here is the true history of a germ, utterly benign and harmless, which terrorized the folk of many lands and was actually responsible for as much suffering and death as some of its pathogenic cousins.

Probably our earliest reference to the "bloody bacillus" comes to us from the pen of the Roman historian, Quintus Certius Rufus, who recorded that when Alexander the Great besieged Tyre in 333 B.C. his soldiers upon breaking bread for their morning meal were dismayed to find "drops of blood" trickling from within the bread. Word of this reached Alexander, who called upon Aristander, Chief Soothsayer, for an explanation. Aristander, anxious to keep his job, stroked his Grecian beard and through it mumbled something to the effect that the siege of Tyre was proceeding as well as might be expected and that the city would ultimately be occupied —which was just exactly what eventually happened. This, he explained, was because the "blood" was seen to flow from within the bread.

Another mention of the same type of phenomenon as recorded by Orosius, Spanish missionary of the fifth century, states that in 91 B.C., in the consulship of Sextus Julius Caesar, Italy suffered civil strife, and ominous portents frightened the city of Rome. A ball of fire appeared from the northern heavens; bread when broken flowed with blood, and, what must have been even more disconcerting to the Roman farmers, a precipitation of giant hailstones lasted seven days.

Pythagoras once wrote that if beans be cooked and placed in the moonlight for several consecutive nights drops of blood will form thereon. So called "bloody bread" has occurred in epidemic form in many parts of Europe through the Middle Ages. In 583 it was noted at Tours, France. Again in 1093 bread baked in ashes yielded drops of blood when broken and at the same time a great pestilence swept the country destroying both man and beast.

These miraculous portents quite naturally were destined to have a profound religious significance in view of the Christian doctrine of Transubstantiation, which was the subject of so much controversy between the ninth and twelfth centuries. So when, in 1169, at Alsen, Denmark,

a priest assisting at the altar saw blood on the Host, the "miraculous nature" of the phenomenon was at once established. In this particular instance the wafers were shown to the chief priest and to the clergy and it was at once assumed by all that something quite grievous was pending, that probably the blood of Christians would be shed—which was just what came to pass. For fourteen days the Selini occupied the country, burned the churches and put to death those who resisted.

Another report, this time in 1191 in Rosetum, sounds a bit colored by the narrators, for it seems that the bread at mass actually "turned to bloody flesh in the sight of all present". Again in 1199 in Augsburg a woman at mass concealed in her mouth a wafer which she took home and covered with wax. Later her conscience drove her to confess her act to a priest who removed the wax and revealed flesh! Needless to say the wafer was guarded as a sacred relic.

Alexander of Halle gives an account which sounds a bit exaggerated in view of our present-day knowledge of the bacterial nature of the pigment which simulated blood. According to his statement blood flowed from the Host when broken until it filled a dish. When later the pieces were laid together they healed and the "blood" flowed back! This was supposed to have occurred in 1200. In the following year a herdsman of Steffenshagen carried home from church a wafer and placed it in a hollow in the end of his staff as a protection from evil. The wafer turned to bloody flesh.

In 1236 in Valencia a castle was being besieged by Saracens. Six of those defending the castle attended mass for the fortification of their courage. In the midst of the ceremony the Saracens broke into the chapel but were quite easily repulsed. The priest wrapped the Host in a cloth and when later it was unwrapped it was found to have become covered with drops of blood which caused the holy bread to adhere to the cloth. The bundle was then packed upon the back of a mule which was set free to wander, eventually arriving at Daroca where the mule died upon arrival. This was considered to be of particular significance because the destination happened to be the birthplace of the priest who assisted in the consecration of the Host.

Eight years later the bloody bacillus visited Beelitz in Prussia. A girl described as a wench took from her mouth a wafer received at the Sacrament and sold it to Jews who stabbed it with a knife and later returned the wafer to her. At the point where the wafer had been stabbed there appeared a drop of blood. Then ensued a massacre in which many Jews were killed. The church whence the wench obtained the wafer became famous as the site of miracles. Soon after, a barmaid of Zehdenik placed a consecrated wafer under a beer cask and the priests upon searching for it were able to find only a spot of blood even upon digging. This happening brought renown to the tavern, which was much frequented by the curious for years afterward.

MOIST BISCUIT INFECTED WITH BACILLUS

Note the blood-like appearance of the resulting growth. The picture at the head of this article shows cultures and colonies in the laboratory containers

On Easter Sunday in Paris, 1290, a woman took from her mouth a wafer received at church and gave it to Jews in exchange for clothing which she had forfeited when unable to repay a loan. The Jews "tortured" the wafer by sticking it full of pins and later finished the job by scalding it in hot water. The wafer became covered with blood and jumped upon a table where it was seen by Christians. The Jews were taken to task and after confession were burnt at the stake.

Six years later, under somewhat similar circumstances, in the vicinity of Frankfurt a wafer came into the hands of Jews who stabbed it, causing blood to form. Word of this reached a priest who secured the wafer and told of the happening. The news spread to Wurzburg, Rothenberg, Nurenberg and other places where general slaughter of the Jews took place. It is stated that in all ten thousand Jews were plundered and put to death in this connection.

Communion bread was again inoculated with the Miracle Bacillus in 1330 by Jews of Mecklenberg who stabbed the bread with knives and later exhibited it bleeding in a covered glass vessel. This, as on a similar occasion in Polka, Italy, resulted in the execution of the guilty parties in this act by instruction from Pope Benedict.

There are on record a dozen or more additional references to the havoc played by this mischievous micro-organism from the fourteenth to the sixteenth century but no hint of the real cause of the miraculous blood was gained until 1819 when the subject was approached from a scientific point of view. In Italy there had been a particularly hot summer and from the standpoint of the farmers it had been a prosperous one. At the home of Antonio Pittarello in Legnaro, near Padua, some cooked polenta mush had been set aside in a pantry overnight. The next day when the mush was brought out to be eaten the Pittarello family was dismayed to find it sprinkled with drops of blood. So great was their fear that they forthwith left the house and would not return lest evil befall them. Within the day reports were current that other homes had been visited by the same phenomenon and the occupants had been charged with mischief. The bloody omen was attributed by the superstitious to the efforts upon the part of some to hold back produce for a higher price.

A Dr. Sette, acting health officer, did not take much stock in the superstitious views held by the simple peasants. He appointed a committee including several professors from the University of Padua and police officials from the neighboring towns. One member of this committee, Bartolomeo Bizeo, recognized the discoloring growth upon the foodstuffs to be the work of a microscopic fungus and he at once set about learning what he could of its properties. He named it *Serratia marcescens*, the first name being given in honor of Serrafino Serrati, Italian physicist who was first to operate a steamboat upon the river Arno. The specific name given the fungus means "putrefying" or "decaying". Bizeo found that he could infect fresh polenta with invisible amounts of the spoiled food and cause the former to become likewise streaked with red. He also found that exposure to sulphur fumes, tobacco smoke, camphor and turpentine retarded the growth and that heating killed it entirely. Dr. Sette transported some of the bleeding polenta to the home of a priest where it continued to bleed, thus quieting the fears of the timid peasants of the region.

It should be remembered that this Padua outbreak occurred some forty years before Pasteur's investigations of fermentations were commenced, and, hence, before the true birth of the science of bacteriology. News traveled slowly in those days and particularly news of a scientific nature, so when the Miracle Bacilli continued to blow about in the air, occasionally lighting upon some nutrient substance where they could multiply and produce visible "colonies", the people continued to be terrorized. In 1848, three decades after Bizeo's exposé of the whole business, brilliant red drops like streaks of crimson oil-paint appeared upon a cooked potato in the home of one who had died of the cholera. The cause-and-effect explanation was accepted; coincidence was not considered.

While it is probable that all cases of food spoilage noted here were caused by the same species of bacteria, it is by no means the only micro-organism which is capable of producing a red slimy discoloration. Simultaneous with the Padua polenta incident was another curious happening. In the same vicinity a pool of stagnant water suddenly turned red, due doubtless to the growth of a red alga stimulated by the unusually hot weather. This pool has since been locally called "the Red Sea". Snow in the Alps is known to turn decidedly red upon occasion due to the growth of another cold weather organism.

In the present age of refrigeration and the more careful handling of foods the Miracle Bacillus has been almost entirely thwarted. He has now passed on into oblivion excepting to those who play with such things. When in a bacteriological laboratory ask to see a culture of *Bacillus prodigiosus*, for that is the name by which this immortal imp is now known. He will be living safely in a test tube on a lump of jelly or on a piece of potato, looking for all the world like a streak of freshly shed blood. Were he able to speak he'd probably say: "Remember me through the ages? Well, it was fun while it lasted."

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HEADS OR TAILS

BY LEWIS WAYNE WALKER

"IT HAS a cavernous mouth, beady eyes, and a rhinocerous-like horn on its head."

Such was the description I got of a caterpillar that roamed a neighbor's morning-glory vine. This apparition invited investigation, and with the ever-ready camera, I decided to see for myself.

The "eyes" stared at us, the horn on the "head" pointed at us, the shadowed "mouth" remained menacingly open. Clamps on the underside of this head held tight to a branch, and then we noticed that it was the *other* end of this monstrosity that nibbled at the leaves! We pictured ourselves as ravenous birds that had come across this tail-less wonder, this animal that had its head where its tail ought to be, or *vice versa*. With one accord we voiced the opinion that, if we had been a pair of birds out looking for a hearty meal, our hunger after a single look would remain unappeased.

PHOTOGRAPH BY DR. T. S. ROBERTS

"THE TAMARACK IS FESTOONED WITH THE GRAY LICHEN WHICH WOODSMEN CALL 'OLD MAN'S BEARD' AND BOTANISTS KNOW AS USNEA"

UNDER THE TAMARACKS

BY EDWARD G. REINHARD

To lush Kartabo and the Gobi Desert, to Turkestan and untamed Mikeno have gone explorers in these later days to spy upon the wildest strongholds of Nature. Life there is ancient and as primitive as in the early days of the world. But to visit scenes reminiscent of the earth's antiquity one need not go far afield. On Cedar Pass in the heart of the Bad Lands, one August midnight, I thrilled to a spectacle as wild as the primordial prologue to history. Again on the barren dunes of Anoka I captured the same feeling, and every time I penetrate the sombre reaches of a Minnesota tamarack bog I seem to be in another world which is just in the process of creation.

As one enters the dense borders of the swamp, still with the heat of June, through a *chevaux-de-frise* of stinging nettles and a fusillade of mosquitoes, one is tempted to show the white feather and seek less arduous habitats. But the lure of something new and different makes the naturalist carry on—and then the song of the veery, like another Lorelei's, calls irresistibly and overcomes the last shred of reluctance. Once safely past the tumultuous margins, the going is easier and the cool shade inspires new life.

Among the tamaracks, how primitive it all appears and how dynamic! Quaking sod under foot, queer foliage overhead, naked snake-like roots, pale paleocosmic ferns, lurid splotches of fungus, deceptive pallets of sphagnum, witch wells of black water, plants that eat animals—a setting where everything is unusual and startling.

The tamarack bog is an island-like remnant of the early vegetation that followed the glacial period. Its evolution is still apparent. In the center of the bog you may still find a small lake that is yielding and shrinking before the usurping vegetation that tries to strangle it out of existence. Perhaps the lake has already succumbed to the smothering blanket which the moss plants have thrown over it. Perhaps it lies hidden under this roof of sphagnum, so damp, so soft, so cold.

Pull away this thick carpet of pale green moss. Underneath, the peaty soil is saturated with water, and deeper down perhaps there is no soil at all, but a pool of cold dark water. In the damp darkness of the soil, centipedes and millipedes are scrambling about, those antiquated creatures that are gifted with such a superfluity of legs that one would think it required all their brains to keep so many feet in proper step. But the earthworms, their co-religionists elsewhere, are here strangely absent. The soil, too acid for the worms, is unmolested by their catacombs.

Shoreward from the cattails and sedges that mark the boundary of the lake and the moss that heaves up and down as one walks upon its surface is a zone of low shrubs, of *Cassandra* and *Andromeda,* of leatherleaf and Labrador tea. Then come the tamaracks, small at first, larger later, until at length the watery gap is bridged and the elm or maple forest preempts the dry

PHOTOGRAPH BY AYER

A GROUP OF MOCCASIN FLOWERS WAVING THEIR RICHLY-COLORED BANNERS IN THE TAMARACK SWAMP

ground. Here, *Cervalces* may once have surveyed the lake.

Walking across the open bog towards the fringe of trees, a woodsman may take advantage of the resiliency of the moss mat to spring a surprise on you. "May I present Mr. Tamarack?" he says smilingly, then takes one firm step forward and a twenty foot tree bows down to acknowledge the introduction! That happens when one steps upon the outstretched roots which have no firm foundation to sustain them.

The tamarack or larch, which so obligingly follows our rules of etiquette, is a tree sure to attract attention. Its lower lifeless limbs are generally festooned with tufts of the gray lichen which woodsmen call the "old man's beard" and botanists know as *Usnea*. The stiff branches bear small cones and tassels of needle-like leaves, but strangely enough the leaves are not evergreen. The roots, those fibrous roots that Indians made use of to bind together their canoes, twist through a soil that is cold and peaty and stretch over tarns of dark water. How cold it is among the roots! Even in midsummer the soil temperature hardly rises above 35° Fahrenheit, and deep down in the peat bogs of northern Minnesota you may find ice still lingering in July! No wonder "the larch with all its fibres, shivered in the air of morning" when Hiawatha made his request.

On her boughs the tamarack sometimes wears the nest of a scarlet tanager. At her feet the veery lays her eggs and sings her weird mysterious song. "*What!*" calls out the crested flycatcher in surprise; and the little tree toads lose faith in their camouflage and cling more tightly to the scaly bark with their curious disk-like toes.

The Blackburnian warbler in lisping tones strings singing wires through the trees. The Nashville warbler pots a tiny fibrous basket in the mossy floor, a basket of frail eggs that is rarely seen. And the dainty Parula warbler—what words can describe its delicate cradle in the gray drapery of *Usnea!* How skillfully it turns up the long loose strands of "the old man's beard" and weaves them into a filigree pouch, a veritable swaying hammock for the pyxie folk.

Where the larches stand thickly, few plants grow under them, but in the more open parts flowers and shrubs grow in wild profusion. Here I go to see *Cypripedium* the moccasin flower, *Arethusa, Calapogon,* and those other bizarre orchids over whose complex structure and peculiar etiquette Darwin meditated for long years and wrote a book that stirs the imagination of the philosopher and inspires the scientist. Rubbing elbows with the plebeian shrubs of the cranberry these spectacular plants wave their richly-colored banners emblazoned with all the heraldry of aristocracy; while the bees, like mechanical robots, are dumb servitors to the designs of the blossoms.

Here too, the crafty sundew with sticky tentacles is busy trapping flies, and the pitcher plants allure insects into a witch's caldron where tiny crawling creatures are made into soup. A strange industry is this, for from the bodies of their victims these carnivores among plants

extract the needful nitrogen to compensate for the scantiness of this element in the soil of the bog.

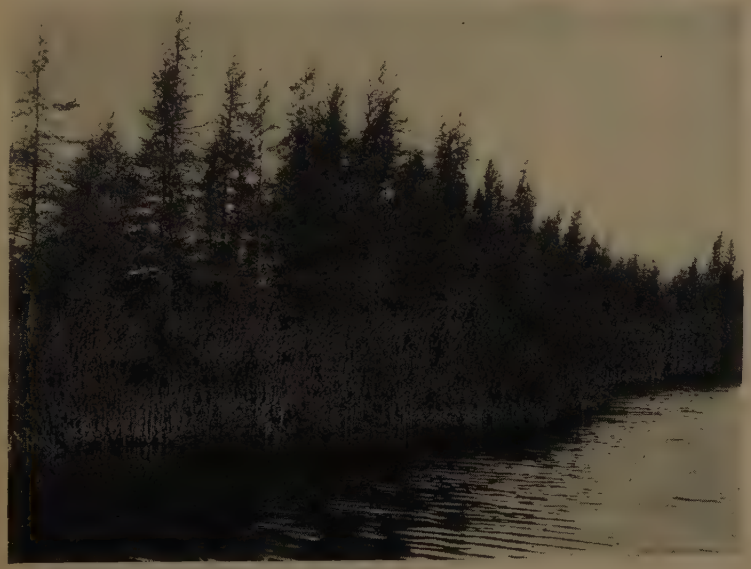
Deluded and incautious as are the insects that yield their lives to the pitcher plant, there is one which actually seeks out the treacherous pit of the pitcher-like leaves, there to propagate life. It is a species of mosquito, and in the water-trap which destroys others, its adventuresome larvae find a home and a nursery in which they can develop to maturity. Finding life and losing life is the sum total of activity in every nook and cranny of Nature.

The tamarack itself, sturdy and proud, must pale and wither in its turn before the onslaught of feeble foes. See there, flitting through the maze of branches is the larch sawfly; browsing upon the foliage are its caterpillar-like larvae; nestled in the soil beneath are its smooth rounded cocoons. That these may live the larch must suffer the loss of its green life-giving tassels.

More strangely still, that the larch may survive, a lowly order of plants administers to its wants. The frail orchids, the heaths and even the sturdy tamaracks are dependent for life and prosperity upon symbiotic fungi which encircle their roots. Unaided by the *Mycorhiza* or root-fungus, the larches and their neighbors could not thrive in this nitrogen-deficient soil. But the fungi, their pale clinging partners, are able to capture free nitrogen from the air and elaborate it into compounds which the larger plants can use.

PHOTOGRAPHS BY DR. T. S. ROBERTS

LABRADOR TEA, A MEMBER OF THE HEATH FAMILY, MAKES A DISPLAY OF ITS EVERGREEN LEAVES AND ITS WHITE FLOWERS



SWAMP POND WITH A BORDER OF CATTAILS MERGING INTO THE TAMARACK ZONE WITH ALL ITS MYSTERY

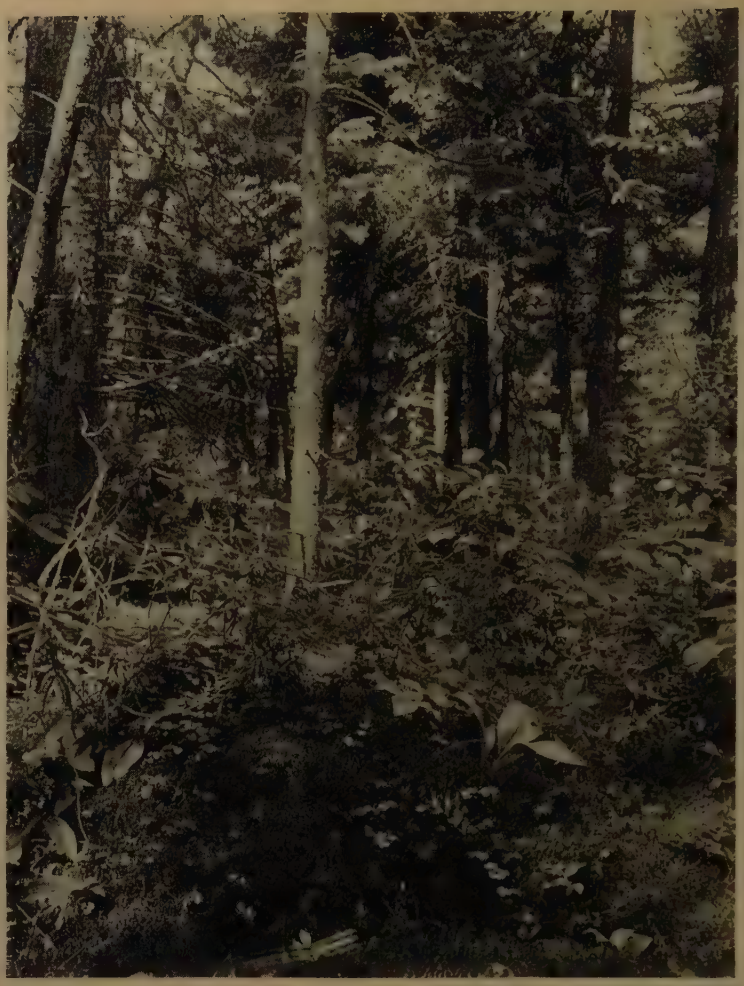
Aside from all these plants and their odd associates, a most important and distinctive element of the bog yet remains to be considered. It is the sphagnum vegetation, sphagnum, in some respects the most remarkable of all the mosses, although belonging to the lowest family. Every member of the family is an "old soak." So fond are the sphagnums of imbibing that they have developed special water-reservoir cells. Indeed, their principal bulk is composed of spongy tissue which holds with tenacity an immense bulk of water. The dutiful starch-making cells are relegated to a mere filmy green network.

Like most bibulous persons, the bog-mosses are inherently social. Arm in arm they swarm over large areas. While enjoying their happy faculty of imbibition they care little if their worn out stems sink into the bog. At the summit, the plant axis is increasing in length, and year by year the moss is raising itself higher and higher upon the matted remnants of its own dead self. The fresh plants, water-logged and heavy, press down upon the detritus of former years, which becomes massed and compact. The chemical nature of the bog prohibits much decay. In time the hard-packed relics form a brown fibrous mass which is known as peat. This is the first stage in the transformation of vegetable matter into coal. Minnesota, the land of lakes and of tamarack bogs has more than five million acres of peat deposits which is equal to fully one-half of the peat area of the entire United States. When other fuels shall have become more costly, the Minnesota peat deposits will doubtless become a valuable asset to the nation.

The sphagnum-tamarack bog is truly a primitive and dynamic environment. Even as you go homewards these qualities stay with you. All unnoticed, little uninvited guests have kept you company while you invaded their domain, and they are with you now. So whether you want to or not, you have taken some souvenirs from the tamarack swamp, flat eight-legged creatures, dark red, peculiarly personal in their attentions. They are the wood

ticks, rascally little idiots that have been lying in ambush on the outermost leaves, waiting for a chance to steal a ride on an unsuspecting animal or human that brushes by.

What in truth is behind that feeling of primitiveness and dynamism which the tamarack bog inspires? Is it merely a poetic fancy? No, we are in the midst of one of the earliest stages of plant succession. Nature is here an active creator, not content with something accomplished, but striving for ultimate perfection. The plant inhabitants of the swamp are not contemplative idlers, they are workmen endeavoring to win flooded ground, preparing unselfishly for the next stage in the succession even though they themselves are thereby eliminated.



PHOTOGRAPH BY JENNESS RICHARDSON

THE HAUNTS OF THE VEERY AND THE NESTING PLACE OF RARE WARBLERS

When the glacial ice sheets melted away, every basin that could hold water was full and brimming. Then began a process of closing these water holes, a process which still goes on in our own day. The larger lakes fought it with wave action and managed to hold their territory. But along the shores of the smaller lakes where mosses and sedges could grow, an invasion of the water began and triumphed.

The sedges and the mosses built a delicate mat around the borders even before the monstrous ice tyrant was out of sight. The mat grew outwards to form a raft. Dead parts fell upon the bottom and by their decay formed a muck or peat deposit. In time, a short time in the geological sense, a lake once a mile or two in diameter was completely obliterated. A bog was formed; first a "quaking bog" where the bottom deposits had not yet risen high enough to support the moss roof. Then a more solid swamp became established.

Meanwhile shrubs and larches, intermingled perhaps with spruce trees, found foothold on the moss and accumulated peat. Drainage engineers were these plants, one and all, bent upon winning land from the waters.

When the work of the tamaracks is done and the swamp is almost reclaimed, then will come upstart ash and elm, then lindens and maples until the hardwood climax forest is perfected. Nature then pauses in her grandest achievement. "We shall rest here," she says. "What I have created is good. Let it survive!"

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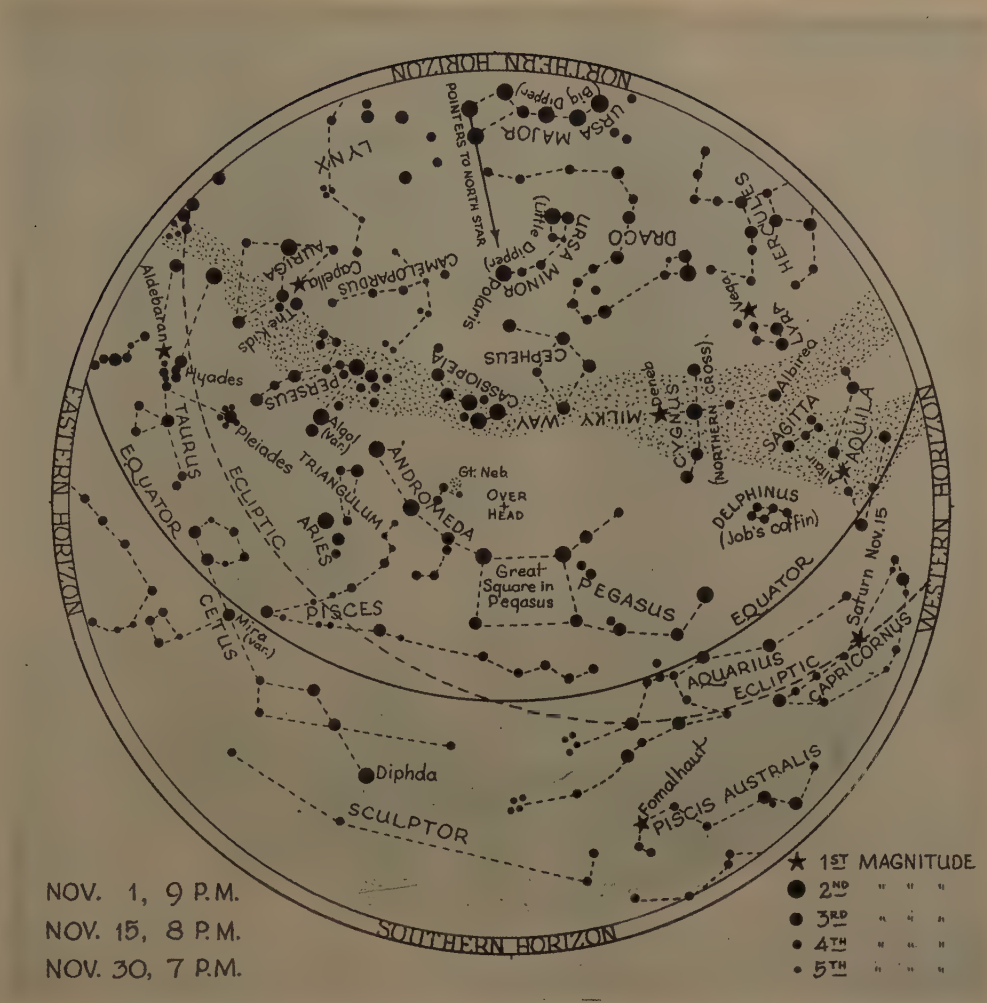
In the December issue of Nature Magazine we welcome to our pages Mark Emerson, who has an amazingly interesting bird story to tell and some fascinating pictures. There will be another of Charles Fitzhugh Talman's weather articles, this time discussing the many attempts that have been made to manufacture weather. Edgar C. McMechen contributes an interesting story of early Indian art fascinatingly entitled "Montezuma's Jewel Box." Dorothy Pletcher has gone back into ancient herbals and other horticultural tomes for interesting information that has a bearing upon the return of the herb garden to popularity. Donald C. Peattie writes another of his charming brief biographies of great naturalists, this time about Louis Agassiz. There is also a startling pictorial feature but we'll not take the edge off that by announcing it in advance.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

SEEING EARTH FROM OTHER WORLDS

BY ISABEL M. LEWIS

If it were possible for us to visit each of the planets of the solar system for a brief period, taking with us the most powerful telescope, the great Mt. Wilson reflector, we would be at one time astonished and delighted at the grandeur of our own planet in the heavens, at another either chagrined at its utter insignificance, or repeatedly unsuccessful in our attempts to find it at all.

Suppose that we first alighted on the planet Venus. Should we be successful in penetrating the dense atmospheric veil in which that planet appears perpetually to be shrouded and in obtaining a view of the night sky under fine seeing conditions at a time when our planet was in opposition to the sun, we would gaze with startled wonder and admiration at the spectacle presented by our own world and its attendant satellite the moon. With a dazzling brilliance, equal to the combined light of six planets as bright as Venus at her best when she appears as Evening Star in the west, our Earth would far outshine any other stellar object. Never more than half a degree away and swinging slowly and majestically around our planet would be seen our satellite the moon, as brilliant as the planet Jupiter. The two appear to form a magnificent double star—our Earth a dazzling bluish-white and the moon a vividly contrasting gold. With the aid of the telescope we would observe the rotation of the earth on its axis and determine the length of its day. We would also find that the earth has an atmosphere, clouds and seasonal changes of color, polar regions, oceans and deserts. As to our satellite we would soon verify the fact that it always keeps the same face turned toward the earth and we would gaze with special interest upon that side of our satellite that is never turned toward the earth and which we have never seen. That it is a barren world devoid of air and water would also be plainly evident. Possibly we would be a little disappointed to note that there is no more direct evidence of the existence of life on the earth as seen from Venus than there is of life on Mars as viewed from the surface of the earth.

Seen from the moon the earth appears at its best as a show object. Swaying slightly to and fro in the course of the lunar month as a result of the moon's non-uniform motion in its orbit, but otherwise appearing always in the same part of the heavens from any one point on the lunar surface that faces it, the earth shines against the ever dark lunar heavens, thickly studded with stars, as a huge globe nearly four times greater in diameter and thirteen times greater in area than the moon. Its rotation on its axis once in every twenty-four hours brings before the lunar observer a constantly shifting panorama of color and intricate markings. Like the moon it also goes through ever changing phases but in the reverse order of those of the moon as seen from the earth.

The most spectacular feature of the earth's surface, when circumstances are favorable for producing it, is the intensely brilliant reflection of the sun from the ocean, which appears as a dazzling spot of light. Clouds appear on the terrestrial globe in great cyclonic storm areas in mid-latitudes, also overlying the vast polar regions of ice and snow, and in the form of belts in the regions of equatorial rains, shifting in position with the seasons. Then there are the ever drifting and changing summer clouds and fogs and mists, all a brilliant, dazzling white reflecting the rays of the sun and seriously hampering the observer in his efforts to study the surface features of the planet. Equally conspicuous are the dull, blue areas, due to atmospheric haze overlying the oceans, seas, lakes and forests. In strong contrast to these are the yellowish tones of the great deserts and the light-greenish tones of the grassy plains and cultivated areas. The outlines of the continents may be traced by the contrast in color tone between land and sea. When, at "new earth", the night side of the earth is turned fully toward the moon the lunar observer sees the faint reflection of moonlight from the earth's surface and the thin, brilliant ring of light surrounding the terrestrial globe that is produced by sunlight shining through its atmosphere. With the aid of the powerful Mt. Wilson reflector the lunar observer would be able to bring the earth within a distance of sixty miles or so of the surface and detect markings the size of a city block, but dimly seen through an atmospheric haze. Possibly the effects of the ebb and flow of the tides along the seacoasts, the eruptions of great volcanoes, the spread of a raging forest fire on the night side of the planet, the glow of the lights of our greatest cities, auroral displays, great floods and overflows of river banks would puzzle and fascinate the lunar observer at his powerful telescope, much as we are puzzled and fascinated by the far less clearly observable markings on the planet Mars. One can imagine the hypothetical inhabitants of the moon journeying from the side of the moon where they never see the earth to the more favored regions of the earth-side of the moon to bask in the light of a full-earth far more brilliant and beautiful than the light of the full moon that is so attractive to the inhabitants of our planet.

Let us now turn from this fascinating and flattering view of our own planet and journey on the wings of light to the planet Mars and there see ourselves as we appear from still another world. Circumstances for studying our own planet are not so favorable there. Viewed from Mars we find that the earth is an Evening Star or a Morning Star when at its brightest and that it then appears about as bright as Jupiter appears to us and exhibits a crescent phase in the telescope. Attendant upon it and forming with it a very beautiful and wide double star, is our satellite, about as bright as a star of the third magnitude when seen in its most favorable position. When the two planets, Earth and Mars, are nearest, Mars is in fine position for observation from the earth because it is then opposite to the sun and all of its illuminated surface is visible from the earth. On the contrary the earth at that time as viewed from Mars is directly in line with the sun at inferior conjunction and has the same phase as the new moon. Its dark or night side is toward Mars and it is, moreover, lost to view in the glare of the sun's rays. For many weeks before and after this time it shows the crescent phase in the telescope, the width of the crescent increasing as it draws farther away from the sun. At elongation, east or west, it is farthest from the sun in angular distance, amounting at the most to about 37 degrees. It then shows the phase of a half moon in the telescope and would be a beautiful Evening or Morning Star.

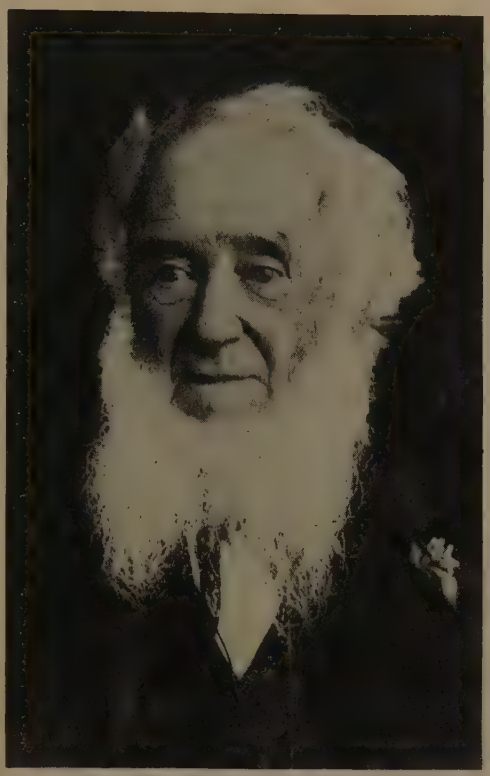
After elongation the earth would be increasingly difficult to observe because of its greater distance, though its phase would be that of the gibbous moon and more of its illuminated surface would become visible as distance from the planet increased. At superior conjunction, when the earth is farthest from Mars, it has the phase of the full moon but is again in line with the sun and invisible. The earth would have its greatest brilliancy to the observer on Mars at a point between inferior conjunction and elongation, as is the case with the planet Venus as viewed from the earth. In fact we would be seen by the inhabitants of Mars under very much the same conditions as Venus is seen by us, only our planet would appear less brilliant than Venus does to us because of the greater distance of the earth from the sun. It would be more interesting to observe, however, both visually and telescopically, because of the presence of its large and bright satellite, the moon. Although observations of our planet telescopically would be greatly hampered by the fact that it is in the crescent phase when best placed for observation, there would be a sufficient variety of color tones and elusive surface markings to puzzle and mystify the hypothetical Martian inhabitants.

Terrestrial clouds would seriously interfere with observations of surface detail, but the rotation of the earth on its axis would be observable. The outlines of continents and seas would be easily discernible and markings one hundred miles or so in diameter could be detected as streaks or spots of light and shade. Seasonal changes of color and tone due to the growth and decay of vegetation would be seen, just as similar changes of color on the Martian surface are visible to us and are believed to be due to the same cause. Of the existence of life on this planet there would be no more (Continued on page 240)

JOHN OBADIAH WESTWOOD

By J. S. WADE

IT IS one of the functions of Nature Magazine to place before its readers from time to time brief sketches containing information, not readily obtainable elsewhere, regarding the lives and achievements of some of the great Nature lovers of the past, who, though well known in their own day and generation, may have become relegated to comparative obscurity by the passage of the years. One very eminent naturalist well deserving an honored place in such an assemblage would be Professor John Obadiah Westwood.



JOHN OBADIAH WESTWOOD
(1805–1893)

He was born in Sheffield, England, on December 22, 1805, his father being a die-sinker at Sheffield who later removed to Litchfield. When about sixteen years of age the young man was sent to London to be articled to a solicitor, and, though he devoted more attention to the study of Nature than of law, he was admitted as a solicitor and presently became partner in a law firm. Having ample private means, which he augmented by writing and drawing, he was able to neglect his profession and to give his time almost entirely to his favorite studies in natural history. His financial good fortune makes his career in this respect the envy of countless other students harassed by poverty. After the toil of long years he became world famous as entomologist, artist and archaeologist. In 1858 F. W. Hope, a wealthy amateur naturalist, who for a long time had been a warm friend and patron of Westwood and had purchased his collections, gave them and his own to the University of Oxford, and founded a Professorship of Invertebrate Zoology, which bears his name. Westwood was appointed first Hope Professor at Oxford to which place he removed from Hammersmith and where he was a conspicuous figure at the University and in scientific circles for more than thirty-five years.

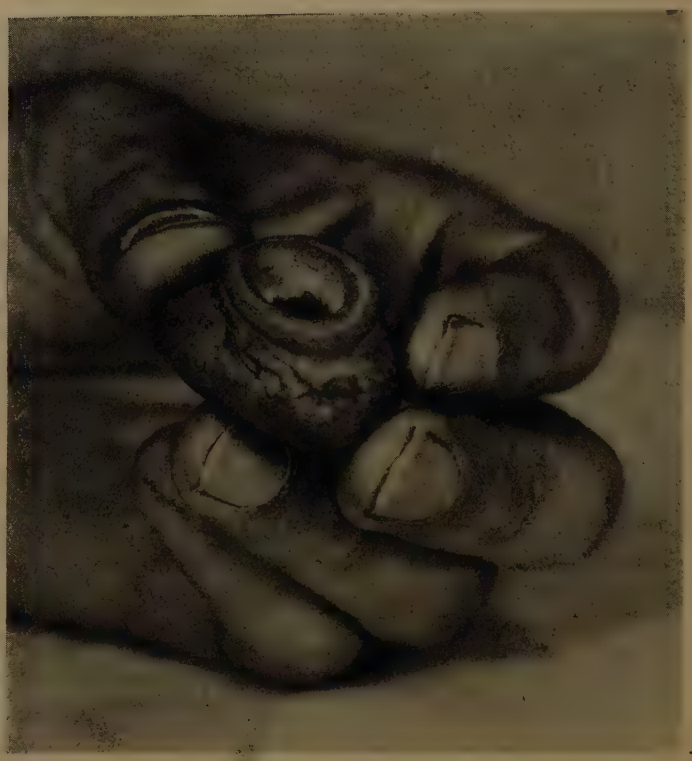
Professor Westwood was best known on this side of the Atlantic from his admirable work entitled *An Introduction to the Modern Classification of Insects,* which was published with illustrations in two large volumes in 1839 and 1840. It long held an honored place in every entomological workshop in the land. This work gained for him the Royal Medal of the Royal Society in 1855. His sumptuous works on exotic insects, such as his *Arcana Entomologica, Oriental Entomology,* and his edition of Drury's *Exotic Insects* also are widely known, although his numerous contributions to scientific periodicals, a mere list of which would fill a small volume, are not quite so well known.

Still, it probably was by his rare artistic talent that he acquired much of his justly great reputation. His drawings were masterpieces of accuracy and were rapidly executed. Few equaled him in correct delineation. He was a most industrious and prolific writer, and made investigations in practically all orders of insects. His work is always characterized by its marvelous accuracy and patient observation and elaboration of details, both of structure and habit. In the field of archaeology he excelled in reproducing old manuscripts, illuminations, representations of old ivories and inscribed stones and his works on these subjects are now rare and costly.

Under a somewhat brusque manner was concealed a hearty sympathy for all real workers and he was always willing and ready to aid others, especially beginners, in Nature work. During his long lifetime he accomplished an almost incredible amount of work simply by careful, plodding perseverance. It is said that he was noted for his eccentricities, one of which was his parsimony in stationery: one seldom received a letter from him that was not enclosed in an envelope that had already been used, and his papers, and memoirs usually were prepared on the blank sides of circulars and other waste paper. "Waste not, want not," appeared to be his motto. As to the accuracy of his work there can be no question, and few men have made fewer mistakes. There was however a somewhat ludicrous incident in this respect: Many years ago he exhibited at a meeting of the Entomological Society what he pronounced to be a gigantic flea, found dead in a bed at Gateshead. He described it as *Pulex imperator,* but he afterwards discovered that it was only the young of a cockroach, crushed laterally. Such a mistake might have crushed a more sensitive or less famous man; as it was the name he imposed on the supposed flea was applied to the man himself for many years. In society he was a genial companion, full of anecdote, but with a small appreciation of humor. At home he was a most generous host. He died at Oxford at the advanced age of 87 years on January 2, 1893, after a lifetime that was full of the enjoyment of life and of accomplishment.

THE LITTLE BROWN JUG

BY GEORGE A. SMITH



It is a rare treat while walking out in the fields to find on a blackberry bush one of these beautiful little brown jugs shaped as if it had been made with the dexterity of human hands. These pot-like nests are built by a little wasp belonging to the family Eumenidae. They are commonly called potter wasps because of their habit of using clay for building their nests. This little insect uses almost human intelligence in preparing the nests for rearing its young. The little jugs are constructed of mud pellets and attached, often several in a row, to twigs where they are sealed after each one has been provided with an egg and an abundant supply of food.

The mother, among these wasps, is confronted with the fact that her children are greedy and will only be satisfied with the choicest of fresh food. She must, therefore, not only build a safe nest in which to lay each egg, but must fill that nest with good food for the young wasp to eat as soon as it emerges from the egg. The food supply stored up in these little jugs consists of caterpillars, spiders, and insect larvae which have been paralyzed by the parent wasp stinging them through their bodies. The strange thing is that the wasp knows the exact place into which to thrust her poisoned lancet in order to paralyze the creatures yet leaving them alive so that they will not dry up or decay before the egg hatches two or three days later.

When the nest is chock full of juicy morsels, the mother lays an egg on top of the mass and seals the nest with a thin wall of clay. In a few days the egg hatches; then the young wasp in the larval stage gorges upon the food provided for it. After transformation, the young wasp emerges from its nest to care for itself while the little brown jug remains to be weathered away, or to be examined and admired by inquisitive eyes that are fortunate enough to spy it in the brushy thicket.

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A CACTUS HAND

BY MRS. JAMES B. REIDY

A GIANT SAHUARO SHOWS ORIGINALITY AND CHANGES ITS METHOD OF GROWTH

Cristate sahuaros are rare and are always prized as picture material by Nature lovers equipped with a camera. I have seen five or six perfect specimens of this desert denizen, but I do not believe that any of them ever impressed me as much as this one with a giant hand. I found it on a ramble near our ranch outside Tucson. For some queer reason the urge to maintain its freakish form forsook this cactus and it set to work to develop this more irregular shape with five fluted columns where only one should be. What a curiosity it will be, if it is spared, when the stubby fingers of the hand have lengthened and branched into an enormous candelabrum! Perhaps some of these arms may even hold aloft other whorled and twisted forms to amaze all beholders.

The growth of the sahuaro is slow, estimated to be from one to four inches a year, so it will be a case of waiting to see what will happen. A picture taken ten years from now and compared with the one on this page will be interesting. We'll keep it in mind.

NATURE RAMBLES WITH UNCLE DICK

A DEPARTMENT FOR THE YOUNG FOLKS

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JOHN AND HIS PET PHRYNOSOMA

BY EDWIN M. LOVE

LITTLE *Phrynosoma* doesn't know he is named that—and doesn't care. He is better known as a horned toad, although he isn't a toad, but a lizard. He might be called an opossum, because he plays dead when in danger. Just what enemy would want to eat him is hard to say. His head is studded with sharp horns. On his back he has scales that are so long that they are also horns.

Little Phryno and his clan, according to the books, inhabit northern New Mexico to California and southward. Members of this interesting family also live in Utah. Their specialty is to bask in the hot sun in sandy or gravelly soil. Then they look so much like the ground that only sharp eyes can notice them if they stay still. Lying quietly like this, they snap up beetles and other insects that venture too near.

Phryno is a nice pet. Although he likes to rest, when ambition stirs him he can dart away with speed that would surprise you. He is not easy to catch if he cares to dodge you, which he does very cleverly. If his tail is gently twisted, he will swell up like a balloon, run forward a few steps, and go down with a sharp hiss through his gaping mouth. If you will look at the happy smile on John's face in the picture you will see that he and Phryno are really great friends and understand each other.

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MARIE, THE BABY WALRUS

BY HARRIET LOVEJOY

MY STORY is about Marie, a baby walrus. She has come to live with the rest of the animals at the San Diego Zoo. She was found by a sea captain on an ice floe way up in the Bering Sea. The captain thought probably the mother was killed by a polar bear. So he took the baby off the floe and put her in a tank of water on his boat.

One of the sailor boys was

appointed as her nurse. He was to care for her, feed her and see that she was properly taken care of.

He fed her milk from a bottle. She was teething and evidently her gums hurt her, and in some way she made it known.

The sailor nurse sometimes would get into the tank with her and rub her gums. It seemed to give her relief and it pleased her.

A walrus is called by the sailors a "sea-hog." They grow very large and have immense tusks. They have to have shells to eat. Marie is fed at the zoo, now she is getting older, with fish and shells ground up together.

Marie is the only walrus in captivity in the world. They do not seem to thrive outside of their natural home, among the ice floes of the Arctic.

One evening, we were entertained over the radio. The animal trainer at the zoo spoke to us saying, "I am going to introduce to you, Marie, our new baby walrus."

Soon, over the wire came Marie's voice in strong, clear tones—"Ooh—ooh—ooh."

She was asked to tell them she was enjoying her new home and was being well taken care of. "Ooh—ooh—ooh," she stated.

After a short conversation, she was asked to say "good-bye" to us.

"Ooh——ooh," she said.

And now my story is done, because you really cannot expect a walrus to say more.

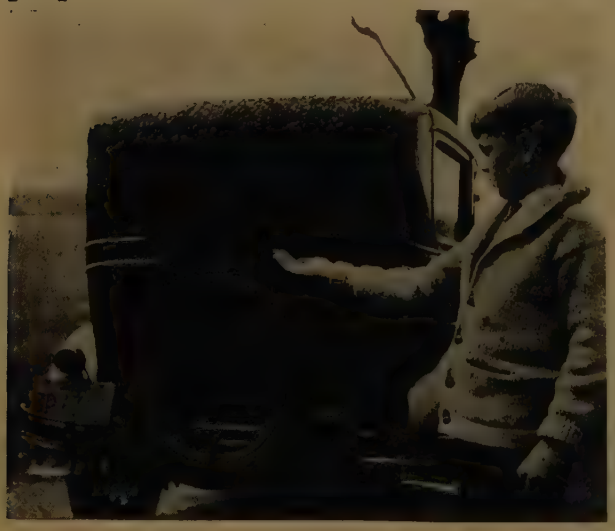
AN ODD NEST

IN New Hampshire, writes Charles Hewitt, who lives in Meredith in the famous Granite State, gray squirrels are protected by law. There are, therefore, many of them. In fact, in the spring they are somewhat of a trouble because they like the sap of the maple trees, and often strip the bark of the trees to get at it. There is one man who has a summer cottage near Meredith. He came up early this year to open it up and got a surprise. In the fire-box of the stove a mother squirrel had made a nest. She and the family came and went by the chimney and smoke pipe. Look closely at the picture and you will see one of the babies who did not get away up the flue before his picture was taken.

BEES AND THE BALL GAME

BY WILLIAM L. ENEQUIST

ALL THE bases were full and there were two out. A slugger was at bat and the fielders dropped back into deep field hoping to snare a long fly. Suddenly a dark, low cloud moved rapidly across the outfield. It buzzed. The outfielders decided they were out there to catch flies, not bees, and set out in the general direction of home plate. Yes, the cloud was a large and dense swarm of bees going somewhere from somewhere else. They circled the now empty outfield while the rest of the players stood poised ready to take to their heels. But the bees ignored the ball game, picked out the back of a shiny sedan and settled down in a mass. While a crowd stood at a respectful distance one of the young spectators tried to see how close he could get. Some of the bees lit on him and he stood like a statue until they left. Finally the game went on. The slugger at bat hit one over the heads of the still scared fielders.



HUMMINGBIRD OF ALASKA

BY E. G. FISHER

WHAT! hummingbirds in Alaska? Most people in the States think you are telling a tall story when such a thing is mentioned. Yet it is a fact that Alaska is a favorite feeding ground for thousands of these feathered mites. In June they migrate through southeastern Alaska. Bird students estimate that it is only a day's flight for these little birds from the State of Washington or southern British Columbia, where they leave the Scotch broom and wild currant for the Alaska blueberry blossoms. A little later they move to the northern interior where the flowers of Alaska are many and of many kinds. The picture shown here was made recently when a hummingbird entered a glassed-in porch in Ketchikan, Alaska. He had come in to feed on honeysuckle blooms, and could not find his way out. So the little fellow stayed to pose for his picture. It looks as though he was making a prayer for freedom. If that is what he was doing his prayer was answered a few minutes after the picture was taken. The window opened for him.

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THE KATYDID'S MUSIC BOX

BY FLORENCE H. MOORE

Katy has a music box
She carries on her back;
Strings and drums and saxophones,
Nothing does it lack.

So Katy found herself a perch,
And touched a tiny key,
Which moved her gauzy, grass green wings
Into the note of "C."

"Katy did—she didn't."
Over each other go her wings;
"Katy did—she didn't—she did!"
But mostly *Mr.* Katy sings:

"Katy did—she didn't—she did!
My ears are in my front leg knees;
Katy did—she didn't—she did!
Here I am among the trees."

PUZZLE: Find the Katydid, the Owl and Bootsie Dog.

If you would play this remarkable musical instrument, first catch Katy—if you can. Then gently move one of the large outer wings over the other, taking care not to hurt it. It will reward you with a sudden clear Katydid solo.

North American Trees

During fifteen years as teacher of dendrology and wood technology at Pennsylvania State College, Professor George Rex Green has been increasingly convinced of the need for a tree book which would give more than the mere botanical characters of trees. In fact, this conviction is one of long standing and Professor Green has been working on such a volume for twenty-two years, submitting it in the meanwhile to foresters and botanists for criticism. Out of this has come *Trees of North America,* in its first volume devoted to the conifers. In considering each species the author has assembled all of the known information which he has been able to discover about the species, the result being that his volume is not only valuable for identification but for use in care and culture of the trees. It should be of value to all concerned with trees, whether as students or as practitioners of tree production and protection. Incidentally, the title is inclusive except as regards Mexico. The book is interesting physically in that it is lithoprinted on one side of the paper leaving a blank opposite page available for individual notes. A second volume devoted to the broadleaves will be published soon. The book sells for two dollars plus postage and is published by Edwards Brothers, Inc., Ann Arbor, Michigan.

Fish Travels

We have heard much about the migration of birds and marvelled at their endurance on their long flights. Most people little realize the equal fascination to be found in the migratory habits of the finny residents of the sea. Now Louis Roule tells the story in a fascinating book entitled *Fishes: Their Journeys and Migrations.* The author is a professor at the National Museum of Natural History in Paris. He is an eminent authority on fishes and likewise boasts a charming manner of writing which is reflected in the excellent translation by Conrad Elphinstone. William Beebe has contributed an introduction; thus the name of our leading popular writer on fish of the sea appears on the cover with that of one who is apparently holder of the same distinction in France. The book is published by W. W. Norton and Company, New York, and sells for $3.75.

Strangers Welcome

If you are a Nature enthusiast and in Los Angeles as visitor or resident, a cordial invitation is extended to you by the active Nature Club of Southern California. In a recent issue of their bulletin the members issue an invitation to strangers saying: "We urge you to join us in order that you may better help us further our great work which aims to develop an abiding love, a true appreciation and a desire to preserve our great outdoors, that great and fast-perishing heritage which is ours to hand on to coming generations." Dinner meetings are held every Tuesday from 5:30 to 7:30 at Boos Brothers Cafeteria, 648 South Broadway, Los Angeles. Miss Charlotte M. Hoak, 1125 Stratford Ave., S. Pasadena, is the executive secretary of the club.

THE COVER THIS MONTH

By R. Bruce Horsfall

On the cover this month is a painting from life of a rare bird in one of its courtship displays. It is the Halmahera Standardwing, *Semioptera wallacei halmaherae,* which for nearly three years has been living happily in the National Zoological Park in Washington.

This species of Bird of Paradise was discovered by Alfred Russel Wallace, the naturalist, in the Island of Halmahera, also called Gilolo, one of the Molucca group. It was not again secured for more than eighty years. Improved methods of scientific collecting and better facilities for shipping have made it possible for our zoological parks to obtain specimens, and this little known species was obtained by the National Zoo.

Early in the spring of 1933, Dr. Herbert Friedmann, of the National Museum, telephoned that this bird was performing, and suggested that pictorial records should be made. Previous to this time these actions had not even been observed. I hurried to the Park and sketched the bird in its various poses.

Birds of Paradise are found only in northeastern Australia, New Guinea and adjacent small islands. With no great powers of flight, they have been isolated in that restricted region by permanent deep water passages since the Tertiary Period of geologic time. The first recorded specimens were two skins of the Greater Bird of Paradise brought to England by Magellan's men, returned from their voyage around the world in 1522. From that date until 1862, when Wallace brought some back alive, the only specimens were skins made up by natives. These skins always lacked feet and wings. This gave rise to a number of romantic conjectures. The common belief was that "They live in the air, always turning toward the sun, and never alighting upon the earth until they die, for they have neither feet nor wings."

Because of that belief, Linnaeus facetiously designated the species *"Paradisaea apoda,"* meaning "birds without feet from Paradise."

The millinery trade exterminated these birds over large sections of their habitat, so that now great difficulties must be surmounted to bring them out of the interior mountains, where some are still to be found. However, when once out and under proper care, they prove to be very hardy.

The bird at the Zoo takes food from the fingers, and feels perfectly at home. While the drawings were being made he was spreading his plumes and gorget, chuckling in the low but harsh voice characteristic of paradise birds, turning about upon the branch or somersaulting from the perch to the water bowl and back again with perfect abandon and rhythm.

About Pelicans

From the Wild Life Division of the Interior Department comes Occasional Paper No. 1 bearing the title *History and Present Status of the Breeding Colonies of the White Pelican in the United States.* It is the work of Ben H. Thompson and the title is descriptive of the text of this 84-page booklet.

Proceedings Reissued

It will be of interest to all workers in biology and to Nature students everywhere to learn that the Council of the Biological Society of Washington just recently has reissued all the various parts of its Proceedings formerly out of print, and can now supply a limited number of complete sets of its Proceedings, volumes 1 to 46, 1881 to 1933, inclusive, or can also supply whatever parts may be needed to complete partial sets now in the libraries of individuals or institutions. Among the items again available is the formerly very rare Volume 3, July 1, 1884 to February 6, 1886, now lacking from a considerable number of otherwise complete sets. This volume contains, pages 35 to 105, inclusive, the well known work by Dr. G. Brown Goode entitled *The Beginnings of Natural History in America,* the continuous demand for which contributed to the speedy exhaustion of the original edition. Lists of desiderata or requests for information should be sent to the Society's Corresponding Secretary, J. S. Wade, U. S. Bureau of Entomology, Washington, D. C.

Plant Keys

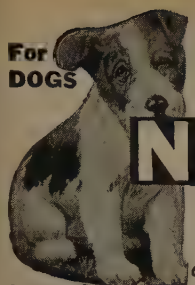
In a 46-page pamphlet under the title *Three Keys to Wild Flowering Plants,* Mary Franklin Barrett has published material of distinct interest and value to the botanically minded. The keys deal respectively with submerged and surface-floating aquatics; autumn flowering monocotyledons and autumn flowering composites. The region covered is confined to Connecticut, southeastern New York, New Jersey and eastern Pennsylvania. The booklets are available at fifty cents a copy from the author, 64 Park Avenue, Bloomfield, New Jersey.

Trans-ocean Flight

A distinguished foreign resident of the Pleasant Valley Bird and Wild Flower Sanctuary at Lenox, Massachusetts, is a European greylag goose, the first to be recorded wild in America. The bird was first discovered by S. Morris Pell, warden of the sanctuary, floundering on the ice of the Housatonic River last December. It was formally identified and took up its residence, molting and coming into adult plumage this summer. It is believed that the bird came across the Atlantic by way of Iceland and thence through Greenland and Labrador, possibly on the wings of a storm as well as on its own wings.

German Scholars

In the field of Science and Nature German scholars have long held an enviable position and have made great contributions. Now, because of racial and religious reasons, men whose names are written large on the records of scientific achievement are being deprived of their influence and opportunity, and the world is being robbed as well. A protest against such activities by the present political administration of the German Republic comes from the Institute of International Education and is signed by some of the most distinguished scholars in our country. When scholarship becomes the victim of political blindness and hatred the world takes a long backward step.



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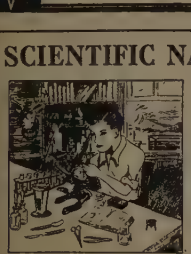

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Jungle Memories

Jungle Memories by Henry H. Rusby is an extraordinary record of an extraordinary expedition, by a medical botanist, across the Andes and through the jungles of South America in search of new medical plants, particularly coca, the basis of the formerly little known drug cocaine. The book is crowded with incident and episode sometimes of an almost fantastic character and with close observation of the natural history and diverse peoples of the regions visited. It is not only a most interesting and stimulating narration of genuine adventure, but it also forms an exceedingly valuable chapter in the history of medical botany and exploration. It is a veritable encyclopaedia of information on the plants encountered which were of medical value, the birds, insects, fish and such like observed, and the manners and customs of the several native tribes en route. The theme is a stirring one and the interest is sustained throughout. The author has a musical style and the gift of artful use of a word or a sentence to visualize a breath-taking experience or situation. With a passion for objectivity and a desire to work in harmony with the facts of science, even of specialization, the book overflows with a spirit essentially human and is sincere and illuminating. The publishers are McGraw-Hill and the price $3.50.

For Child Playtime

Organized and directed play for children is today recognized as of great importance in the development of youngsters and in giving them the faculty of cooperative effort. Often this task is delegated to others but the interested and thoughtful parent may also plan some of the play hours effectively. Two books which are an aid to that have just come to our attention. These are *Indoor and Outdoor Plays for Children* by John Farrar and *101 Ways to Entertain Your Child* by Jane Parker. The former volume contains nine different plays, demanding only moderate sized casts, suitable for different seasons of the year. The second volume is designed to answer the question of what to do with the child confined to bed or to the home through illness. All parents know what a problem this is and the author most helpfully answers it. Both volumes are published by Noble and Noble, New York, and sell for two dollars each.

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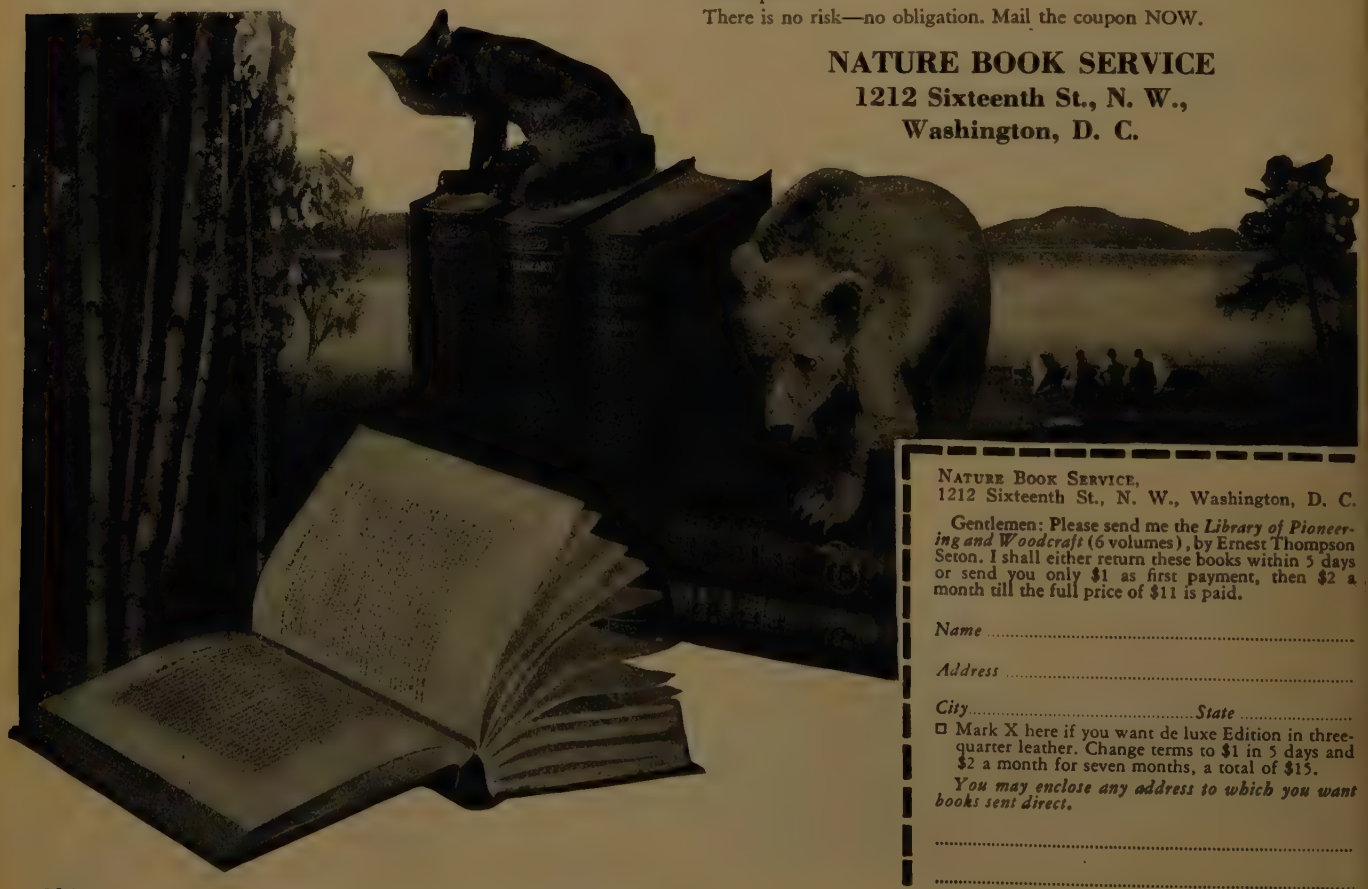

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GARDENS AND GARDENING

Edited by
ROMAINE B. WARE

Looking back over the garden year just closing, I wonder if you're satisfied? I hope not, because, if you are, then your garden has about reached a standstill. The moment one begins to feel satisfied with his garden it starts losing interest for him and usually begins to go backward. Either you are adding to and improving it each season or you are allowing it just to drift.

One of the greatest joys of home gardening is to plan for a better garden next year. As you clean up the debris of this year's garden you should vision the effect you want next year. Never be content with the same old things. If your snowball bush has been an eyesore because the bugs attack it every year, dig it out and replace it with something else. No plant which is an everlasting bother from one cause or another has any right to a place in your garden.

If you have some peonies in your borders that have been there five or six years and, though growing good enough, have never bloomed, dig them out and plant something else. Do not, however, plant other peonies in the same holes unless the soil is replaced with new soil. Experience has proven that replanting in soil in which they have previously been grown invites disease and frequently results in plants not blooming. There is still time to plant peonies where the ground is not frozen.

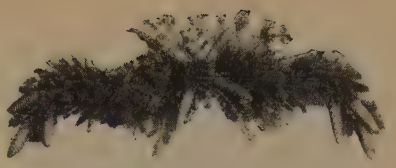
Every garden that has suffered from insects, blights and rusts this season should be thoroughly cleaned up. Cut off and remove all infected material, burning every particle down to the last leaf. The more thorough the clean up this fall, the less danger of infection next year.

Was your rose garden all you hoped for this season? It's not too late to plant roses this fall. The fact is, except where the freeze-up comes very early, November is an excellent month for this task. Never have good roses been so reasonable, and there are so many new and interesting ones available today that one should not be satisfied with the old ones.

If you have never enjoyed the Christmas rose in your garden you may do so by planting in a cold frame. They will grow outside with little or no protection but the blooms will be better if afforded the shielding of a frame. In moving them, take a large ball of soil as they resent having their roots disturbed. Once established, they are best left alone as old plants produce the best display of bloom.

The coming weeks are ideal for planting deciduous trees and shrubs. Be sure to mulch liberally just as soon as the ground is frozen to prevent them being heaved by frost. Trees should also be carefully braced with guy wires so the winds of winter will not loosen them. Use pieces of old garden hose over the wire to prevent cutting the tree bark.

Winter covering is an important consideration at this season. Avoid the use of leaves, especially those from soft-wood trees, as they mat down too much and become soggy with moisture. Coarse wild hay or salt hay is one of the finest winter covers as it does not pack down and still provides ample protection with a natural tendency to stay put.



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RAINBOW TRAIL CABIN

By LUCIE HURLBUT BRAINARD

A few miles beyond the western limits of the Triple Cities is located the beginnings of a wild life sanctuary and home for native New York state trees, shrubs and wild flowers. On this tract of land comprising about six acres high up in the wooded hills nestles a little log cabin, built of native materials, so rugged and rough it seems a part of the landscape itself. The cabin was built in 1930 of chestnut logs which were smoothed down to the grain and given several coats of oil and turpentine to bring out and intensify the varying shades of brown and tan and also to preserve the logs which only a short time ago were living trees stricken before their time by the ravages of a blight which has nearly erased the noble chestnut tree from our forests. The cabin is built on stone and cement piers extending into the hard-pan stands on a cleared space of about one acre, which has not been tilled for some time, and shows in a striking manner the way Nature takes care of her own, and plants and nurtures like the skilled landscape architect she is. In July the hillside is white with the feathery clusters of New Jersey tea. In a few weeks these are gone and hundreds of Queen Anne's lace nod and dance in the breeze. After these too fade away, along come the gay little fall asters, a symphony in blue, purple, lavender and mauve, colors that mingle and harmonize with the gradually browning leaves and fields. Just a few feet to the rear of the cabin is a woody slope covered with white pine, soft maple, poplar, sassafras, hickory nut and ironwood with its swinging tassels, besides several varieties of oak, set in a tangle of wild grape, blackberries, chokecherries and ferns, a favorite spot for many birds, including the brilliant towhee, bluejay, wood-thrush, phoebe, catbird and chickadee. Also the ruffed grouse finds here an ideal spot for hatching and rearing her young. Just at dusk and again at dawn, if one is listening, may be heard Wilson's thrush or veery, which once heard is never forgotten—

"But far away, and far away the tawny thrush is singing,
New England woods at close of day with that clear chant are ringing:
And when my light of life is low, and heart and flesh are weary
I fain would hear before I go, the wood-notes of the veery."

Phoebes, taking advantage of the protecting eaves, build their nests in the nooks and corners of the cabin. A bird bath of native stone, the top stone with a shallow depression holding water, has been built by the owner. A bird-feed is also provided and a tiny wren house swings from an oak tree. Suet is fastened to the trees, all of which attract and invite the birds. Rabbits, woodchucks and deer mice are abundant and even the shy deer have been seen many times, especially during the summer months before the fall hunting season opens, after which they seem to leave for a time, possibly to seek more impenetrable haunts. Around the cabin plantings are being made of dogwood, hemlock, scarlet maple and flame azaleas; directly in front and sloping to the dirt road a natural-looking rock bank is being constructed. Native wild flowers will be largely used, such as columbine, hepaticas, black-eyed Susans, bottle gentian, violets, linaria (butter and eggs). Through the woods is a winding trail leading to the top of the hill where the view of the valley seen through the pines is still more picturesque. Along the road to the cabin is a field of bottle gentian in shades of light and dark blue; also a short stretch of woods and many wild flowers. Because of the beauty and color of this little winding road it has been named "The Rainbow Trail". In the fall hundreds of sumacs set the hills aflame with color and the wild cherry trees take on a brilliant hue. The road to the little cabin may be rough, it surely is steep, and unimproved, but it leads to a spot enchanted.

The log cabin is simply furnished, and, as simplicity is beauty, the interior is quaint and charming. The furnishings are almost entirely of old pieces salvaged from the attic, barn and other places and put in perfect repair by members of the family. On the wide low door, which boasts a latch-string, is an old door knocker with a brass plate on which is inscribed the name "Timothy Page" and date "1797." It was handed down to the owner from his great-grandfather. There is a little hand-carved dressing table of pine nearly one hundred years old, two Shaker slat-back chairs still older, a curly maple tobacco-box with deep pocket for the long-stemmed pipes once used and a little drawer to hold the tobacco. This box belonged to the father of Timothy Page and was brought from England. A long slim Revolutionary rifle hangs over the mantel. A large fireplace and chimney of native stone are at one end with swinging crane on which hangs a heavy black iron tea-kettle. In the evening a pierced tin lantern throws eerie rays of light to each corner making a canopy of lights and shadows. Each of the three windows frames a picture of unusual beauty. The south window looks out on the wooded hills and little village in the valley with its white church and spire and cluster of houses. And across the river a partial view of another village is seen. The two wide front windows frame a view of the valley below, the winding Susquehanna River and the distant horizon.

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Seeing Earth from Other Worlds

(Continued from page 228)

direct evidence from telescopic observations made on Mars than there is of life on Mars from observations made on this planet. We may imagine the hypothetical Martians puzzling quite as fruitlessly over the possibilities of life on this planet as we do ourselves over life on Mars.

As we leave the surface of Mars and journey outward among the planets we find it increasingly difficult the farther we go to observe or even find our planet. Its brightness will, of course, decrease inversely as the square of its distance from the observer and the change in phase at different points in its orbit will cause an additional variation in its brightness. Except when it may become visible during an eclipse of the sun by the satellite of an outer planet it will be lost in the glare of the sun most of the time. Seen from Jupiter the greatest elongation or greatest distance that the earth would ever have east or west of the sun is eleven degrees. At the distance of Saturn this would be reduced to about six degrees; at the distance of Uranus three degrees, and at the distance of Neptune about two degrees. That of Mercury viewed from the earth is about thirty degrees. At the distance of the outermost planets it would not even show a perceptible disk in the telescope and could never be seen except when the sun was eclipsed by one of the four satellites of Uranus or the lone satellite of Neptune.

Conditions would be a little more favorable for seeing the planet from Saturn or Jupiter during the numerous eclipses of the sun by the satellites of these planets. The earth would show an appreciable disk telescopically from both of these planets and would appear as a fine double star with its satellite. It could also be observed telescopically from Jupiter in the daytime under favorable circumstances and possibly also from Saturn, but nothing could be seen on the surface except a few hazy patches of varying shade and color. The planet that is the finest object in the heavens next to the sun when viewed from Venus or the moon would be seen only on rare occasions as an inconspicuous star-like object from the planet Uranus and Neptune! At the distance of the nearest star there would be no evidence of the existence of a single planet, not even the giant planet Jupiter. All would be lost to view in the rays of the sun even before the outskirts of the solar system were reached.

The annual shower of the Leonids will occur the middle of November and the best displays are to be expected on the nights of November 14 to 16 after midnight. It is possible that more than the usual number may be seen this year and a special count should be made of members of this shower by those interested in the observation of meteors. The true members of the swarm are rapid-moving and bluish in color. They will be met by the earth "head on", the radiant lying in the Sickle of Leo. It was expected last year and the year before that Leonids might appear in greater numbers than ordinarily because the swarm is known to have a thirty-three year period of maximum display which was due to return in 1932. For some reason the great display appeared to be side-tracked, and, although more than the usual number seem to have been observed, the shower was in no way extraordinary. A close watch will also be made this year, but there now appears to be slight hope of a big display.

Venus is in fine position for observation this month as Evening Star in the southwest. Its brightness is increasing and it will reach its greatest elongation east of the sun on November 25. Mercury is in an unfavorable position this month as it is in inferior conjunction with the sun on November 17.

The constellation of Orion may be seen rising on the eastern horizon about nine-thirty P.M. November 1. Andromeda and the Great Square in Pegasus are then just south of the zenith, and Cassiopeia is also on the meridian high above the north pole, while the Big Dipper rests nearly on the northern horizon. Aquila and Cygnus are in the west, Taurus and the Pleiades in the east. All of the brilliant first magnitude stars of winter will soon be visible in the eastern sky.

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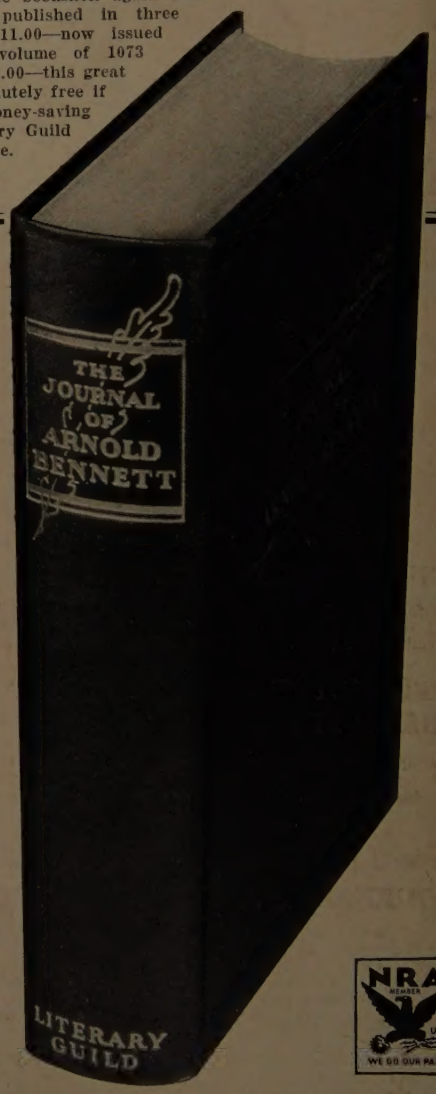

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